

## Chapter 4

John Mosesso, Jr./NBII



*Green frog*

## Management Direction and Implementation

## Management Direction and Implementation

### Introduction

This chapter is in three parts. In combination, it describes the array of management actions that, in our professional judgment, work best toward achieving the refuge purposes, the vision and goals developed during the planning process, and the goals and objectives of other Service, State, and regional conservation plans. We believe that implementing these actions will also effectively address the key issues raised during plan development.

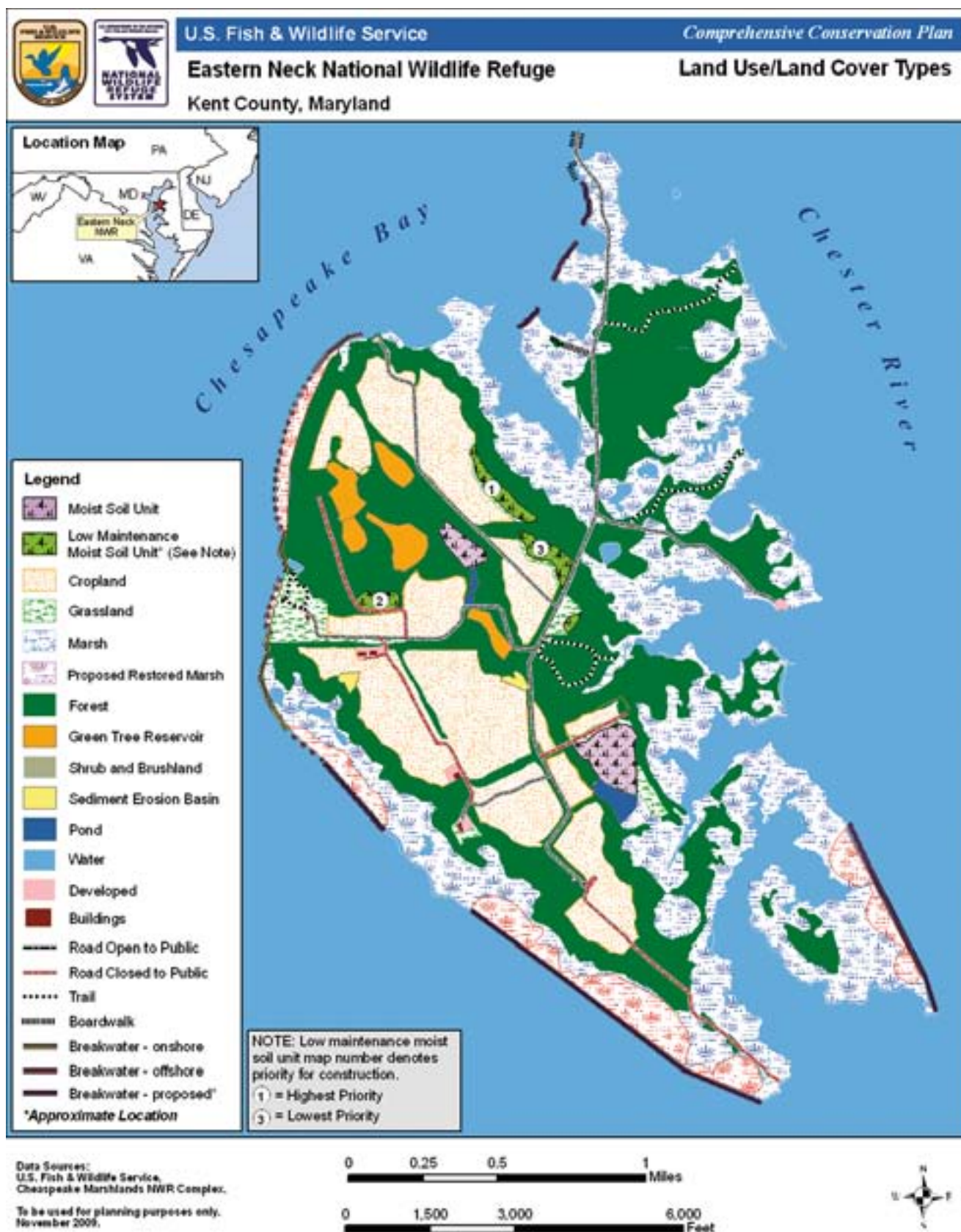
The first part of this chapter, “Summary by Major Program Area”, describes the overall intent of our management as it relates to major refuge program areas. The second part, “General Refuge Management,” describes specific refuge activities that support multiple goals and objectives. The third part, “Goals, Objectives and Strategies”, describes refuge actions that were developed to achieve specific goals and objectives.

Our highest priority in this CCP is the protection and restoration of the refuge’s shoreline, and shallow water and tidal marsh habitats. Without addressing the threats to these valuable habitats, the integrity of the entire refuge is compromised. Our next highest priority is to enhance upland habitat for wintering waterfowl and other migratory birds of conservation concern (map 4.1; table 4.1). In addition, we will expand inventorying and monitoring of biological resources to improve our knowledge of, and capabilities for, conserving Service trust species and the habitats on which they depend. We will also focus on improving our existing public use and visitor services programs (see map 4.2). Although we emphasize wildlife observation and photography, we will also continue to provide high-quality hunting, fishing, and environmental education and interpretation programs. All of our programs will continue to benefit from strong partnerships and dedicated volunteers. We will also work to increase the visibility of the Service and the refuge in the local community, and better communicate information about the refuge, its management, and its significance to the regional and local landscape.

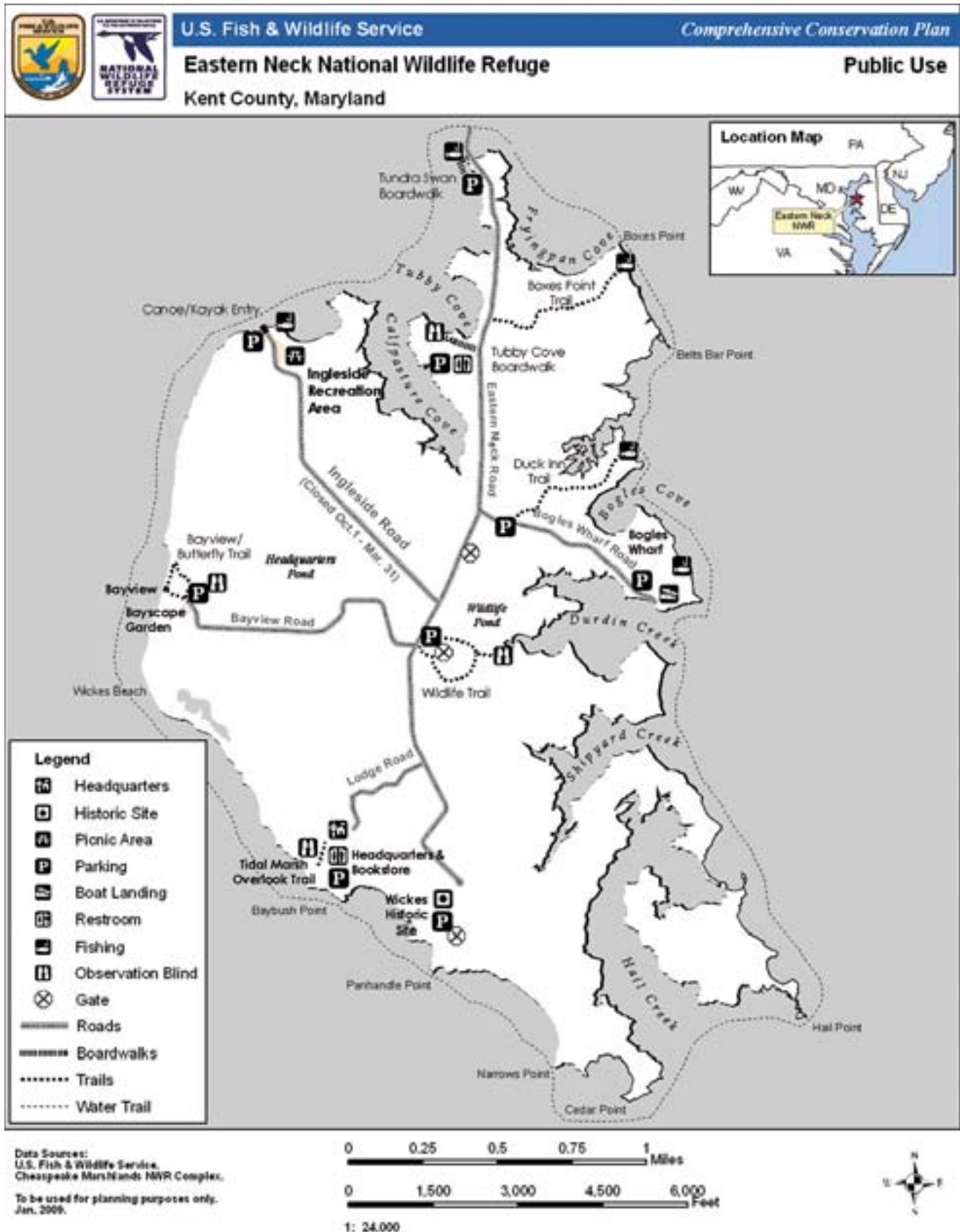
*Waterfowl on Hail Creek*



Map 4.1. Projected Habitat Distribution after CCP implementation



Map 4.2. Projected Public Use Infrastructure Under CCP Implementation



**Table 4.1. Projected Habitat/Land Use Acreage after CCP Implementation\***

Land Use and Habitat Types	Current	After CCP Implementation
Shrub and Brushland	18.1	0.0
Cropland	557.1	403.4
Forest**	708.1	853.4
Grassland	30.7	40.3
Marsh	858.8	858.8
Developed	10.5	10.5
Managed MSU	28.4	28.4
Low Maintenance MSU	1.3	22.1
Sediment Erosion Basin	4.2	4.2
Pond	8.3	8.3
Water	60.5	60.5
<b>TOTAL</b>	<b>2,286.6</b>	<b>2,286.6</b>
Green Tree Reservoirs**	38.0	38.0
Proposed Restored Marsh+	0.0	107.8

\*Acres are approximate based on a combination of GIS-interpreted acres, survey acres, and deed acres

\*\*Green Tree Reservoirs are managed within the "Forest" land cover type, and therefore, those acres are not additive to the total refuge acres

+Proposed restored marsh acres are an approximation. Every 5 years we will work with Service surveyors and cartographic experts to determine whether these acres replace eroded or lost acres, or are additive to the total refuge acres.

## Summary by Major Program Area

### Introduction

This first part of the chapter describes the overall intent of our management as it relates to major refuge program areas. It describes in a general way the management philosophy or framework for developing the more detailed objectives and strategies in this CCP.

### Fish, Wildlife and Habitat Management

As noted above, shoreline and shallow water habitat protection and tidal marsh restoration are our highest priorities. Our activities will be accomplished with the continued valuable cooperation of partners and volunteers. Improvements in our cropland and moist soil management programs to benefit wintering and migrating waterfowl is our second highest priority. We will also continue to emphasize controlling invasive plants species with are prevalent on the island and represent one of the biggest threats to biodiversity.

Additionally, we are expanding our inventorying and monitoring to improve our knowledge and capability to conserve Service trust species, other species of conservation concern, and the habitats on which they depend. We are expanding our support of compatible research programs and use of the refuge to demonstrate restoration and adaptive management practices. We look to significant involvement by partners to help us plan and implement those programs.

### Public Use

We are improving our existing public use programs, with particular emphasis on wildlife observation and photography, and adding to our infrastructure in the form of new kiosks and signs. We will continue to provide high-quality fishing, hunting, environmental education, and interpretation opportunities in designated areas that are compatible with refuge purposes and the mission of the Refuge System. Some public uses will continue to be seasonally restricted to avoid interfering with important nesting or wintering seasons of species of concern. Some other areas will remain closed year-round where public safety or natural and cultural trust resources are likely to be adversely affected. We are continuing to facilitate refuge volunteer programs and public events, and encourage the use of refuge lands by our partners, assuming those activities promote our goals and the Refuge System mission. Outreach to the communities in our area will be improved in an effort to raise Service visibility and increase the awareness and understanding of the Refuge System mission, in general, and this refuge's purposes, in particular. To a large extent, we look to our volunteers and Friends Group to help implement those outreach events, and to lead interpretive and educational activities.

### Refuge Staffing and Administration

It is important to recognize that our proposals in this document do not constitute a commitment for staffing increases, or funding for operations, maintenance, or future land acquisition. Our budgets are determined annually by Congress, and distributed through our Washington and Regional offices, before arriving at field stations. Below we describe activities related to staffing, administration, and operations. Implementing these activities supports all our refuge goals.

#### *Permanent Staffing and Operational Budgets*

Our objective is to sustain annual funding and staffing levels that allow us to achieve our refuge purposes, as interpreted by the goals, objectives, and strategies. Many of our most visible projects since refuge establishment were

achieved through special project or “earmarked” funds that typically have a 1- to 2-year duration. While these funds are very important to us, they are limited in their flexibility since they typically cannot be used for any other priority project that may arise.

In response to Refuge System operational funding declines nationwide, a Regional Work Force Plan was developed in 2006 to support a new base budget approach. The goal is to have a maximum of 75% of a refuge complex’s budget cover salaries and fixed costs, while the remaining 25% or more will be operations dollars. The intent of this strategy is to improve the refuge manager’s capability to do the highest priority project work and not have the vast majority of a refuge’s budget tied up in inflexible, fixed costs. Unfortunately, in a stable or declining budget environment, this may also have implications on the level of permanent staffing.

As we discussed in chapter 1, Eastern Neck Refuge is part of the CM Refuge Complex. Resource management, visitor services programs, staffing and budget priorities among the other three refuges will be established each year for the entire Refuge Complex by the Project Leader. As we identify priorities in this document for Eastern Neck Refuge, these will be considered equally in terms of their potential to contribute to the overarching goals established in the 2006 CM Refuge Complex CCP. In the case of Eastern Neck Refuge, this change in organization could potentially increase the amount of resources available for refuge projects, assuming those projects are determined to be a priority for the refuge complex. Unfortunately, the opposite is also true and there may be times when refuge projects are not funded.

The Project Leader has identified five permanent, full-time positions to be assigned to Eastern Neck Refuge. Not all positions are currently filled. While these staff will be assigned to this refuge, they will also occasionally work on other refuges in the Refuge Complex as needed. The five positions are: a wildlife refuge specialist; a biological technician, a maintenance worker, a visitor services specialist; and a law enforcement officer. Other Refuge Complex staff will frequent Eastern Neck Refuge, but will continue to be assigned to the headquarters office.

The additional staffing we propose will provide further depth in implementing our biological and visitor services programs and will enhance our outreach and enforcement capabilities. These positions are identified where they are needed under the respective goal and objectives presented below. A figure representing the staffing chart for the Refuge Complex, including those positions to be assigned to Eastern Neck Refuge are presented in appendix D – Refuge Staffing Chart. We also identify our recommended priority order for new staff positions in appendix C, Refuge Operations Needs (RONS) and Service Asset Maintenance Management System (SAMMS) tables.

#### *Facilities Construction and Maintenance*

Over the last seven years, we have made significant progress in rehabilitating the old lodge for use as the refuge headquarters and visitor contact station,

improving our equipment storage and maintenance/shop area, constructing new visitor services facilities, improving access and security, and promoting sustainable energy sources.

We will continue to make incremental progress in constructing new, modest, high-quality visitor services facilities such as interpretive and informational signs and parking areas. We will continue to identify and remove those structures that have no useful purpose or that pose safety hazards. We must also take care to maintain both new and rehabilitated facilities to Service standards to keep them safe, functional, and attractive.



*Using alternative energy on the refuge*

We continue to service, repair, and maintain existing renewable energy infrastructure as needed. In addition, we are evaluating whether to erect new solar panels at the refuge headquarters which has significant electrical usage and public visitation year round. This will depend on funding and whether a suitable site can be located where disturbance is minimal and the panels would be able to work efficiently. In summary, the Project Leader will fully evaluate the alternative energy structures on the refuge and, if necessary, remove them, modify their design, move them to more effective locations and/or add additional infrastructure. The Service remains committed to use of renewable energy sources to the fullest extent feasible on refuge lands.

One of the highest priorities in our maintenance program is to complete the rehabilitation of the lodge. The lodge is eligible for inclusion on the National Register of Historic Places, and most of it was rehabilitated to historic standards over the period 2000–2006. However, there are still a few needs to complete the planned work. Once rehabilitation is complete, maintenance of this facility will remain a priority. This project is identified as a SAMMS project in appendix C.

#### *Refuge Operating Hours*

We will maintain the operating hours currently in place for the foreseeable future. The county-owned roads (Eastern Neck Road to the junction with Bogles Wharf Road, and Bogles Wharf Road itself) will remain open 24 hours a day, seven days a week. Adjacent refuge lands designated for public access would generally be open from sunrise to sunset, seven days a week. In 2008, an electronic gate was installed on Eastern Neck Road where a manual gate formerly existed. Access hours are now adjusted electronically according to changes in sunset times and day-light savings. Operating hours are established to insure visitor safety and protect refuge resources. In addition, the Project Leader has the authority to issue a special use permit to allow others access outside these timeframes. For example, research personnel or hunters may be permitted access at different times, or organized groups may be permitted to conduct nocturnal activities, such as wildlife observation, and educational and interpretive programs.

## General Refuge Management

### Introduction

This second part of the chapter describes actions that were common to all three alternatives evaluated in the draft CCP/EA. These are actions required by law or policy, or represent actions that have undergone a separate NEPA analysis, public review, and/or agency review, and approval. Or, they are administrative actions that do not necessarily require public review, but are actions we wanted to highlight in this plan. Finally, most of the actions outlined in this part of the chapter support multiple goals and objectives, and in order to minimize redundancy, we chose to describe them separately here in more detail rather than list them repeatedly in the third part of this chapter.

### Protection of Federal-listed and Recently De-listed Species

We describe the history of the Federal-listed endangered Delmarva fox squirrel on the refuge in chapter 3. This rare squirrel has been present on the refuge since its introduction to the island by hunters in the 1920's (CBFO 2007). Their numbers at Eastern Neck Refuge have declined to the point where there are only one or two sightings per year. This was not entirely unexpected because it is an island population, isolated from any other source populations. For this reason, over the last several years, we have not pursued active management for this squirrel, and together with the recovery team, we have determined that the refuge population is no longer deemed essential to its recovery. However, we will continue to monitor for it, and protect those individuals we locate. Further, if recommended by the recovery team, we would assist in periodic, intensive surveys for the squirrel to confirm population status. Our expectation is that the few remaining individuals will not develop into a viable population over the long-term, and resources that might be focused on improving the refuge for this species would be far more effectively used to address the many other refuge issues. As noted previously, while loss of the population on the refuge may seem dramatic and severe, it is important to recognize that squirrel translocations to other sites in Kent County and elsewhere on the Delmarva Peninsula have been very successful (CBFO 2007) and those populations are expanding (see map 3.5). The species is now on the brink of recovery and all of this past effort has led the way for this response.

The bald eagle was recently removed from the Federal list of threatened and endangered species. However, it continues to be protected under the Bald and Golden Eagle Protection Act, as well as the Migratory Bird Treaty Act. We will continue to protect nesting bald eagles and their habitat on the refuge. There are currently seven nesting pairs and the refuge will continue to monitor the nests and breeding activities and prohibit the public from disturbing them.

Very rare sightings of Federal-listed endangered loggerhead and leatherback sea turtles, and humpback whales have occurred in the Bay. These marine species are under the jurisdiction of National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS).

We have submitted this CCP to the Service's Ecological Services Office – Chesapeake Bay Field Office for intra-agency Endangered Species Act consultation and received their concurrence that the plan complies with that Act. The results of that consultation are included as appendix F, Intra-Service Endangered Species Act (Section 7) Compliance. As future projects are planned and implemented, we will conduct additional consultation with the Service's Ecological Services division and NOAA, as appropriate, regarding threatened and endangered species.

### Control of Pest Plants and Animals

The 2007 Integrated Pest Management Plan for the CM Refuge Complex addresses control of native pest plants and animals as well as non-native invasive species. At this time, two waterfowl species are considered pest species and controlled on the refuge: the exotic, invasive mute swan and resident Canada geese.

*Mute Swan Management*

Despite their aesthetic appeal, mute swans can cause problems. We identify three major plans in chapter 1 specifically responding to the numerous issues and concerns these birds have caused within the Atlantic Flyway, the Chesapeake Bay, and the state of Maryland. The mute swan is native to Europe and Asia, but is an exotic species in the United States. In Maryland, the swan population reached its peak in 1999 with 3,955 birds. Today the population is <1,000 as a result of an integrated population reduction effort by MD DNR and other cooperating agencies whose management goals are to protect critical Chesapeake Bay living resources, particularly submerged aquatic vegetation (Hindman, personal communication 2008). Population growth and range expansion of this species has increased the number of swan-related problems for people and native wildlife.

It is well-documented that mute swans reduce the availability of submerged aquatic vegetation. Concentrations of mute swans have over-grazed submerged aquatic vegetation and other bay grasses to the point that habitat has been eliminated for crabs, fish, and other wetland dependent species (Tatu et al. 2007). This impact has also resulted in reductions of recreational crabbing and fishing opportunities.

In the early 1990s, a large molting flock of mute swans caused a colony of least terns and black skimmers, both state-threatened species, to abandon their nesting site on Barren Island in Dorchester County by trampling nests containing eggs and chicks. This was the only skimmer nesting colony in the Maryland portion of Chesapeake Bay. These swans also displaced nesting Forster's and common terns, declining species in Maryland (CBMSWG 2004). In other areas of the state, mute swans have also been documented killing mallard ducklings and Canada goose goslings.

A major concern is the effect of inter-specific competition between mute and tundra swans. Mute swans have been observed exhibiting aggression toward tundra swans, driving them from protected coves and feeding areas, important habitats for native tundra swans (Caswell et al., 2007). Since the mid-1970s, Maryland's wintering tundra swan population has declined by about 30%. However, research is needed to determine if this decline is related to an increase in competition between native tundra swans and exotic mute swans.

Since the mid-1990s, the MD DNR and some Federal agencies within Maryland have controlled mute swans to prevent their establishment on lands that they manage. Control has included preventing eggs from hatching, live capture and removal of adult swans and humane euthanasia of adult swans. The DNR authorizes landowners to control swans that cause either nuisance or property damage problems. These mute swan control activities have also been combined with efforts to increase public awareness of the problems caused by mute swans. In general, control has been supported by the public. However, animal rights activists object to lethal control methods.

The Service worked with states in the Atlantic Flyway to develop the Atlantic Flyway Mute Swan Management Plan (refer to link <http://www.dnr.state.md.us/wildlife/> to see complete plan). This plan established mute swan population goals for the Atlantic flyway, along with strategies to begin reducing populations to levels within the parameters of the Migratory Bird Treaty Act. The Service also participated in the development of the 2005 Mute Swan Chesapeake Bay Management Plan which establishes goals for managing mute swan within the Bay area. Refuge staffs work closely with MD DNR to implement this plan.

DNR created a Mute Swan Task Force to develop management recommendations. The cornerstone of the task force recommendations was the protection of native species and their habitats from the effects of mute swans. The Task Force recommended and DNR has established "swan-free areas,"

where mute swans are excluded or removed to protect critically important habitats and wildlife resources. Eastern Neck Refuge and the other refuges in the CM Refuge Complex are DNR-designated swan free areas (MD DNR 2003a).

In partnership with DNR, our treatment goal is to prevent competition with native migratory waterfowl. Eradication is the definitive goal; however, this may be unachievable if adjacent landowners are not willing or able to control mute swans. It is important to be vigilant in management efforts and monitor all areas throughout the year.

We will

- 1) Visually monitor all areas throughout the year, and take appropriate actions to discourage mute swans from becoming established or congregating on the refuge;
- 2) To the extent possible, eradicate mute swans found on the refuge to reduce competition with native waterfowl. Limit swan reproduction by oiling eggs and removing adult swans. Coordinate control efforts with MD DNR, Virginia Dept of Game and Inland Fisheries, and U.S. Department of Agriculture Animal and Plant Health Inspection Services.

#### *Resident Canada Goose Management*

The phrase “resident Canada geese” refers to geese nesting within the conterminous United States during the months of March, April, May, or June, or residing within the conterminous United States during the months of April, May, June, July, or August (USFWS 2005). Historically, Canada geese migrated through Maryland and other states during fall and winter and did not remain year-round. Most of the Canada geese that use the Refuge Complex are migratory Atlantic Population Canada geese. The resident Canada geese do not migrate, but remain year-round, and adversely impact habitats through excessive herbivory which reduces habitat for migrating waterfowl. Resident Canada geese feed on clover, grasses, and cereal grains year long, depleting resources necessary to support migratory Canada geese and other waterfowl.

Our treatment goal is to manage 90 to 100 percent of the resident Canada geese population to reduce competition with migratory waterfowl. We will

- 1) Visually monitor all areas throughout the year, and take appropriate actions to discourage resident geese from becoming established or congregating on the refuge;
- 2) Use “scare” tactics to flush geese from croplands and impoundments when preferred vegetation is most vulnerable;
- 3) To the extent possible, eradicate resident geese found on the refuge to reduce competition with native waterfowl. Use lethal means as necessary to remove adults.

#### *Invasive Plant Management*

The establishment and spread of invasive plants is a significant problem that reaches across all habitat types. For the purposes of this discussion, we use the definition of invasive species contained in the Service Manual (620 FW 1.4E): “Invasive species are alien species whose introduction does or is likely to cause economic or environmental harm, or harm to human health. Alien species, or non-indigenous species, are species that are not native to a particular ecosystem. We are prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere.”

The unchecked spread of invasive plants threatens the biological diversity, integrity and environmental health of all refuge habitats. In many cases, these plants have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. Over the past several decades, government agencies, conservation organizations, and the general public have become more acutely aware of the negative effects of invasive species. There are many plans, strategies, and initiatives targeted toward more effective management of invasive species, including *The National Strategy for Management of Invasive Species* for the National Wildlife Refuge System (2003), *Silent Invasion —A Call to Action* by the National Wildlife Refuge Association (2002), and *Plant Invaders of Mid-Atlantic Natural Areas* by the Service and the National Park Service (2002). New information and updates on recent advances in control techniques are continually provided through the Refuge System biological discussion database and relevant workshops. There are also more funding sources, both within the Service's budget and through competitive grants, to conduct inventories and control programs.

Guidance for managing invasive species on refuges is found in the Service Manual (620 FW 1.7G). These actions, as stated in the Service Manual, serve to define our general strategies on the refuge:

- 1) Manage invasive species to improve or stabilize biotic communities to minimize unacceptable change to ecosystem structure and function and prevent new and expanded infestations of invasive species;
- 2) Conduct refuge habitat management activities to prevent, control, or eradicate invasive species using techniques described through an integrated pest management plan, or other similar management plan, which comprehensively evaluates all potential integrated management options, including defining threshold/risk levels that will initiate the implementation of proposed management actions;
- 3) Evaluate native habitat management activities with respect to their potential to accidentally introduce or increase the spread of invasive species and modify our habitat management operations to prevent increasing invasive species populations;
- 4) Address the abilities and limitations of potential techniques including chemical, biological, mechanical, and cultural<sup>1</sup> controls and techniques during Refuge Complex integrated pest management planning; and,
- 5) Manage invasive species on refuges under the guidance of the National Strategy for Invasive Species Management and within the context of applicable policy.

More specific strategies for the refuge include:

- 6) Continue treatment of the most problematic species as funding and staffing permit;
- 7) Maintain early-detection/early-response readiness regarding new invasions;

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<sup>1</sup> "Cultural control" refers to the deliberate management or modification of the pest plant's environment or habitat through variations of standard horticultural or silvicultural practices. In the refuge's natural habitats, examples of cultural practices include selecting or favoring native plants with appropriate hardiness to outcompete invasive plants, maintaining healthy buffers along forests, streams and shoreline, and minimizing soil and vegetation disturbances that would attract invasive plants. In cropland areas, the use of crop rotation, inter- or mixed-cropping, and managing water and fertilization are examples.

- 8) Remove parent sources of highly invasive species (species that are high seed producers, or vigorous rhizome producers) from along edges of management units;
- 9) Maintain accessibility to affected areas for control and monitoring;
- 10) Continue and increase efforts to involve the community in promoting awareness of invasive species issues, and to seek assistance for control programs on and off the refuge.

In addition to these general strategies, we will refine our control program to address the most critical problems first. Further, our priorities may be adjusted to reflect regional Service priorities, and/or based on new information or resource availability. We will continue to track the spread and control of all invasive plants on the refuge using GIS, GPS, permanent vegetation monitoring plots, and photo points. We will also continue the following efforts to address the four invasive plant species of primary concern here: common reed, also known as *Phragmites*, mile-a-minute, Johnsongrass, and Canada thistle.

In the discussions that follow for each species, we identify potential mechanical, prescribed burning, cultural, chemical, and biological controls or treatments. With regards to chemical controls, we list the current approved herbicides by trade name and primary active agent. It is important to note that not all of these herbicides are used every year in treating invasive plants, and the list of herbicides may change in the future with new information or new approvals for more effective herbicides. All herbicides, including their application rate, are approved by the Regional Contaminants coordinator prior to their use.

#### *Phragmites*

*Phragmites* invades tidal and non-tidal brackish and freshwater marshes, river edges, shores of lakes and ponds, roadsides, and disturbed areas. Once introduced, *Phragmites* spreads quickly and will crowd out native plants, changing marsh hydrology, altering wildlife habitat, and increasing fire potential. It's high above ground biomass blocks light to other plants and occupies much of the growing space belowground. *Phragmites* is also considered a hazardous fuel and easily ignites during arson or wildfire. *Phragmites* has invaded natural wetlands and impoundments throughout all refuges and divisions within the CM Refuge Complex.

We will:

- 1) Utilize seeded native plants to accelerate establishment of native plant communities and reduce competition from invasive plants
- 2) Monitor known infestation sites for significant adverse impacts on wildlife habitat.
- 3) Seed or plant disturbed sites with native species.
- 4) Control 100% of *Phragmites* where native plants are inhibited or where fire hazards need to be reduced. Control will be applied in any area where water level and wildlife habitat is unacceptable due to *Phragmites* growth. Target control is based on specific situations. However, in cases of severe shoreline erosion, we may make the decision to retain *Phragmites* in certain areas to prevent further erosion until we can establish native vegetation. We provide more information on *Phragmites* control and shoreline erosion under Objective 1.1.1 below.

## 5) Maintain healthy stands of native perennial plants.

We will continue to use one or more treatment options that include use of herbicides, prescribed burning, and mechanical treatments to provide the best results. Specific strategies follow.

Management	Time of Year	Comments
Hand pull	April–May	When plants are small, make sure to pull roots
Mow	All year	Repeat throughout growing season
Burn	November–March	Do not burn in spring (may stimulate growth)

*Chemical:* Treat with imazapyr, glyphosate, or similarly effective and approved products, and consider in combination with prescribed burning as developed through a prescribed burn plan. If a population can be controlled soon after it has established, chances of success are much higher because the below-ground rhizome network will not be as extensive. Herbicides are best applied in late summer/early fall either as a cut stump treatment or as a foliar spray. It is often necessary to do repeated treatments for several years to prevent any surviving rhizomes from re-sprouting.

*Prescribed burning:* Use prescribed fire after the plant has flowered, in combination with herbicide treatment, to reduce standing dead stem and litter biomass. This might help to encourage germination of native plants in the following growing season. Plants should not be burned in the spring or summer before flowering as this may stimulate growth.

*Mechanical:* Use repeated mowing, which may be effective at slowing the spread of established stands, but is unlikely to kill the plant. This method is most effective when used in combination with herbicide treatments.

We will continue to treat with imazapyr, or similarly effective and approved product, in appropriate locations (where hardwoods are not adjacent to treatment area) in July–September. Glyphosate, or similarly effective and approved products, will be used September–October in areas untreated with imazapyr. Treated areas will be burned from November–March. Priority areas include restoration sites, impoundments, natural wetlands, ditches and any area necessary to reduce hazardous fuels. We will monitor using visual inspection, GPS, and permanent photo points.

Herbicide*	Time of Year	Treatment	Comments
Glyphosate	September–October	Foliar application, cut stump treatment	Apply when flowering
Habitat (imazapyr)	July – October	Foliar application, cut stump treatment	Apply during active growing season, do not apply near hardwoods (can mix with glyphosate)
* Specific herbicides are listed which are used presently, but any similarly effective and approved products may be used in the future.			

*Mile-a-Minute*

The mile-a-minute weed is an herbaceous, annual, trailing vine that is widely distributed throughout the refuge, and is a high priority for management. Mile-

a-minute weed generally colonizes open and disturbed areas, along the edges of woods, wetlands, stream banks, roadsides, and uncultivated open fields, resulting from both natural and human causes. It will tolerate shade for a part of the day, but needs a good percentage (63-100%) of the available light. The ability of mile-a-minute to attach to other plants with its recurved barbs and climb over the plants to reach an area of high light intensity is a key to its survival. This invasive spreads rapidly and is difficult to manage once established.

Our treatment goal is to prevent competition with newly seeded native plants in habitat restoration sites, future restoration areas, and native wildlife habitat. We will pursue the following objectives:

- 1) Monitor known infestation sites, newly seeded areas, roadways, sites of previous human occupation, and other disturbed sites (e.g., remediation areas, wildfire areas) depleted of native perennial plants.
- 2) Seed disturbed sites with native species.
- 3) Control 100% of mile-a-minute to reduce competition with native plants and maintain native wildlife habitat.
- 4) Keep records of treated areas in GIS.
- 5) Maintain healthy stands of native perennial plants.
- 6) Monitor treatments using visual, GPS and permanent photo points.

We will continue to use one or more treatment options that include mechanical, cultural, and biological treatments, and the use of herbicides to provide the best results.

Management	Time of Year	Comments
Pull	April – October	Repeatedly pull plants when young
Mow/Cut	April – July	Mow before plants go to seed

Specific strategies follow.

**Mechanical:** Hand-pull seedlings throughout the summer. The site must be rechecked at frequent intervals, and removal of new plants continued until the seed germination period is complete, roughly early April until early July. Repeated mowing or trimming of mile-a-minute plants will prevent the plants from flowering and thus reduce or eliminate fruit and seed production.

**Cultural:** Employ cultural methods to discourage the introduction of mile-a-minute to an area. It is important to maintain vegetative community stability and to avoid creating gaps or openings in existing vegetation. Maintaining broad vegetative buffers along streams and forest edges will help to shade out and prevent establishment of mile-a-minute weed. This will also help to reduce the dispersal of fruits by water.

*Chemical:*

Various herbicides can be used to treat mile-a-minute (see table to right). The chosen herbicide may depend on funding, and other invasive target species and non-target species in the vicinity of the management area. Dead plants may be burned or mowed. In 2006, we chemically treated mile-a-minute with

Journey from June–August and with a mix of Garlon 3A, Escort, and glyphosate in July.

Herbicide*	Time of Year	Treatment	Comments
Plateau (imazapic)	April - October	Foliar	Target early growing season. Repeat application throughout the season.
Plateau / Glyphosate			
Overdrive (sodium salt of diflufenzopyr)			
Journey (imazapic/ glyphosate)			
Garlon 3A (triclopyr) / Escort (metsulfuron methyl)/ Glyphosate	June - August	Foliar	Target early growing season. Repeat application throughout the season.
* Specific herbicides are listed which are used presently, but any similarly effective and approved products may be used in the future.			

*Biological:* Use an Asian weevil, *Rhinoncomimus latipes* (R. latipes), as a biological control for mile-a-minute as long as research and field trials determines it is still a viable option. Adult R. latipes are about 2mm long, and are black, but may be covered by an orange film derived from plant exudates once they start feeding. They eat small holes in young leaves of mile-a-minute and lay their eggs on leaves and stems. After hatching, larvae bore into the stem where they complete development, then exit the stem and drop to the soil for pupation. Weevils are very small, but can be observed directly in the field, especially at the ends of terminals. Additional information on this weevil can be obtained from a Final EA titled, “Field Release of *Rhinoncomimus latipes* (Coleoptera: Curculionidae), a Weevil for Biological Control of Mile-a-Minute Weed (*Polygonum perfoliatum*) in the Continental United States” was published in July 2004 by USDA, Marketing and Regulatory Programs, Animal and Plant Health Inspection Service (APHIS).

*Johnsongrass*

Johnsongrass is a 3 to 10 ft tall erect, perennial grass that produces seed the first year. Seedlings develop rhizomes three to four weeks after emergence (McWhorter 1981). Johnsongrass is a serious weed pest in all annual agricultural crops, grasslands, ditches, and roadsides. It grows in a variety of soils, and it thrives in fertile lowlands. Lands infested with Johnsongrass can produce seven tons of rhizomes per acre, and ten bushels of seed per acre (McWhorter 1981). Johnson grass is declared a “noxious weed” throughout the U.S. and management of this species is required by state law. It is found on croplands and grasslands on the refuge and its control is a high management priority. We will control Johnsongrass wherever it occurs on the refuge to comply with state law and to prevent competition with newly seeded native plants in habitat restoration sites, future restoration areas, and native wildlife habitat.

To accomplish this, we will:

- 1) Monitor all potential habitats for the presence of Johnsongrass during routine mowing, maintenance and vegetation monitoring activities.

- 2) Treat 100% of Johnsongrass - targeting for elimination - to reduce competition with native plants germinating in the spring. Reseed control areas with native species where cover is needed.
- 3) Maintain healthy stands of native perennial plants by mowing, scything, herbicide treatment, or fire.

We will continue to use one or more treatment options, including primarily mechanical treatments and use of herbicides, but also cultural treatments, to provide the best results. Specific strategies follow.

*Mechanical:* Mow repeatedly, and pull seedlings from May through June.

*Chemical:* Use herbicides to control the upper plant, but recognize these chemicals do not always translocate to the dormant buds found on the rhizomes, and these buds remain viable and later

Herbicide *	Time of Year	Treatment
Glyphosate / Arsenal (imazapyr)	May - July	Foliar
Plateau (imazapic)		
Accent (nicosulfuron)		
* Specific herbicides are listed which are used presently, but any similarly effective and approved products may be used in the future.		

germinate. Pre-emergent treatment will control seedlings, but not established stands. Various herbicides can be used to manage Johnsongrass (see the table below). The chosen herbicide will depend on funding, and other invasive target species and non-target species in the vicinity of the management area.

*Cultural:* Use cultural control methods in established stands of Johnsongrass where rhizome development can be controlled. Rhizome production is reduced if plants are kept shorter than 12 to 15 inches. Well managed crop rotation provides competition, and it slows the development of rhizomes. If cultivation is not repeated, the infestation can spread, since broken rhizome segments can produce roots and shoots. Fields cultivated every four to five weeks offer the best results, and the recommendation is to use several tools - one to cut the rhizomes into small sections, and another to bring the fragments to the soil surface.

#### *Canada Thistle*

Canada thistle is an herbaceous perennial with erect stems 1½ to 4 feet tall, prickly leaves and an extensive creeping rootstock. It produces an abundance of bristly-plumed seeds which are easily dispersed by the wind. Canada thistle grows in barrens, glades, meadows, prairies, fields, pastures, and along roadsides. It does best in disturbed upland areas, but also invades wet areas with fluctuating water levels.

Canada thistle is found in grasslands, croplands, dike and road edges on the refuge. It is declared a “noxious weed” throughout the U.S. and management of this species is required by state law. We will eliminate Canada thistle where it occurs on the refuge to comply with state law and to prevent competition with newly seeded native plants in habitat restoration sites, future restoration areas, and native wildlife habitat. To accomplish this, we will:

- 1) Monitor all potential habitats for the presence of Canada thistle during routine mowing, maintenance and vegetation monitoring activities.
- 2) Treat 100% of Canada thistle plants - targeting for elimination - to reduce competition with native plants germinating in the spring. Reseed control areas with native species where cover is needed.

- 3) Maintain healthy stands of native perennial plants by mowing, scything, herbicide treatment, or fire.

We will use a combination of mechanical and chemical weed management options for the best results. Specific strategies follow.

*Mechanical:* Hand-cut individual plants, or mow larger infestations prior to seed set. If the plants begin to set seed, seed heads are cut and bagged. This must be repeated until the starch reserves in the roots are exhausted. Canada thistle can also be managed through controlled burns late in the growing season. Early season burning of Canada thistle can stimulate its growth and flowering.

*Chemical:* Repeated applications are necessary due to the long life of seeds stored in the soil. Various herbicides can be used to manage Canada thistle (see the table above). The chosen herbicide will depend on funding, and other invasive target species and non-target species in the vicinity of the management area.

Herbicide*	Time of Year	Treatment
Overdrive (sodium salt of diflufenzopyr)	Bud stage (May – June)	Foliar application
Transline (clopyralid)		Foliar application
Garlon (triclopyr)/ Glyphosate		Foliar application
2-4-D (dichlorophenoxyacetic acid)		Foliar application
Milestone (aminopyralid) and/or Escort (metsulfuron methyl)	May– June	Foliar application
* Specific herbicides are listed which are used presently, but any similarly effective and approved products may be used in the future.		

### Light Goose Monitoring

While not currently an issue on the refuge, we are aware of concerns by Service and state waterfowl experts that greater and lesser snow geese and Ross's geese (collectively referred to as "Light Geese") may be changing their migrating and wintering habits in the Atlantic flyway, and their use may dramatically increase on protected areas such as the refuge over the next 15 years. With completion of an environmental impact statement, the Atlantic Flyway Council and individual states have implemented a Light Goose Conservation Order. The principal action to be taken in the state of Maryland is an extended hunting season on light geese (lesser snow and Ross' goose, combined). This could result in a shift in use by geese in the region, and concentrating their use on the refuge, which does not have a waterfowl hunting season and provides desirable forage in its cropland management program. We will monitor for increased use by light geese in conjunction with our other waterfowl surveys. Monitoring results will be shared with MD DNR, other refuges in the region to ascertain whether a pattern is developing. Should light goose numbers increase to the point that AP Canada geese and other waterfowl focal species are, or may be, adversely impacted, we will consider modifying our management to discourage use. Actions that may be considered include a reduction in cropland management, select control of light geese which may include using non-lethal scare tactics, lethal control, or any other proposals to discourage light goose recommended by Service and state waterfowl experts.

### Monitoring and Abatement of Wildlife Diseases

The Service Manual chapter on Disease Prevention and Control is not yet published. Until it is, we derive guidance on this topic from the Refuge Manual and specific directives from the Director of the Fish and Wildlife Service or the

Secretary of the Interior. Refuge Manual 7-RM-17.3 lists three objectives for disease prevention and control:

- 1) To manage wildlife populations and habitats so the likelihood of disease contraction and contagion are minimized;
- 2) To provide for early detection and identification of disease mortality when it occurs; and
- 3) To minimize losses of wildlife from disease outbreaks.

These objectives were published in 1982. Since that time, in addition to diseases that cause serious mortality among wildlife, more attention has been given to those diseases that are transmitted through wildlife to humans. One example is Lyme disease. In 2002, a Service Manual chapter on Lyme Disease Prevention was published (242 FW 5) to make employees, volunteers and national service workers on refuges aware of this disease and how to prevent it and treat it.

Avian influenza is also receiving considerable worldwide attention. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, all refuges were instructed to prepare an Avian Influenza Surveillance and Contingency Plan. The plan covering refuges in the CM Refuge Complex was approved July 2007 (USFWS 2007e) and discusses methods for dealing with this disease.

Chronic Wasting Disease (CWD) is a fatal disease that attacks the brain and spinal cord of deer and elk. While the exact cause is unknown, it is believed to be caused by a prion—an altered protein that causes other normal proteins to change and cause sponge-like holes in the brain. CWD was first identified in the 1960s in a Colorado research facility and since that time it has been found in Wisconsin, Wyoming, Nebraska, New Mexico, South Dakota, Illinois, Utah, Kansas, Minnesota, Montana, Oklahoma, New York, West Virginia and Canada. CWD has not been found in white-tailed deer in Maryland. Prion diseases, like CWD, do not move easily between species. There is no scientific evidence that CWD has been transmitted to animals other than deer, elk, and moose.

The MD DNR has conducted targeted surveillance for CWD since 1999 and began active surveillance in 2002. Each year a sample of hunter harvested deer are examined with brain and lymph node samples taken. The Maryland Department of Agriculture (MDA), Maryland Department of Health & Mental Hygiene (DHMH) and the U. S. Department of Agriculture (USDA) are integral partners in all CWD surveillance plans to assist in monitoring wild deer populations, and protect domestic animals and health. The State reported that, as of June of 2007, CWD was not present in Maryland deer. The Service, and nine other Federal agencies, developed a comprehensive plan to assist the states in management of the disease in free-ranging deer and elk. This plan includes disease surveillance, control, and diagnosis, as well as information and education outreach. A draft Northeast regional plan to address CWD in the region and a clear plan of how to complete the draft were outcomes of the meeting. Site specific plans will be stepped down from the regional plan. A CWD management plan for the CM Refuge Complex was approved in 2007.

### **Forest Health Management**

In addition to wildlife diseases, we will be attentive to diseases and insect pests that affect forest health. Since we place high value on oak hardwood forests on the refuge, diseases and insects that affect oaks are of special concern. Oaks in the U.S. are affected by more than 80 documented insects and diseases, with escalating international trade likely to introduce new pests. Impacts of these pests range from minor defoliation to rapid mortality. In some years, pests cause

the loss of a major portion of the acorn crop, impeding oak regeneration. A few pests have altered, or may alter, eastern U.S. oak forests on a broad scale. For example, the spread of the introduced gypsy moth, a defoliator, has been aided in the last few decades by the accidental transport of egg masses by humans. In 2007, the U. S. Forest Service (USFS) conducted an aerial survey to look for gypsy moth damage on the refuge, but none was found; however, we will remain vigilant in looking for it and treat commensurately, after receiving necessary approvals, with the risk. Previous to the 2007 survey, the most recent forest health report was conducted in 1983 in conjunction with developing a forest management plan.

General strategies for disease prevention and control include:

- 1) Continue to conduct disease and pest surveillance in conjunction with other field work;
- 2) Cooperate with Federal and state agencies, particularly MD DNR, and USFS in conducting surveillance, providing access for sampling, and following protocols in the event of an outbreak;
- 3) Establish a systematic program to monitor forests and other habitats for indicators of increased occurrence of pests or disease. For example, note changes in flowering or fruiting phenology, physical damage, decay, weakening, sudden death, particularly of canopy and source trees of major host species, and note changes in wildlife use of habitats such as the absence of breeding birds that used to be seen regularly;
- 4) Conduct assessments as a priority after severe events occur (e.g. wind, drought, ice, fire) or any other event resulting in significant tree loss or blowdown. Consider appropriate stand treatments to reduce risk from pests and pathogens; and,
- 5) Follow protocols outlined in national, state, and refuge-specific disease prevention and control plans.

### **Biological and Ecological Research and Investigations**

Guidance on conducting and facilitating biological and ecological research and investigations on refuges is found in the Refuge Manual and the Service Manual. In 1982, the Service published three objectives for supporting research on units of the Refuge System in the Refuge Manual (4 RM 6.2):

- 1) To promote new information and improve the basis for, and quality of, refuge and other Service management decisions;
- 2) To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general; and
- 3) To provide the opportunity for students and others to learn the principles of field research.

In 2006, the Service Manual (603 FW 1.10D(4)) provided supplemental guidance in terms of the appropriateness of research on refuges, as follows: “We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate

or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research.”

All research conducted on the refuge by others must be determined in writing to be both appropriate and compatible. As noted in chapter 3, “Existing Environment,” we have found several research projects to be appropriate and compatible. We expect that additional opportunities to conduct research on the refuge will arise in the future. In making determinations on the appropriateness and compatibility of future research proposals, we will follow guidance in the Refuge and Service Manuals, and will employ the following general strategies:

- 1) Seek qualified researchers and funding to help answer refuge-specific management questions;
- 2) Participate in appropriate multi-refuge studies conducted in partnership with the U.S. Geological Survey;
- 3) Facilitate appropriate and compatible research by providing temporary housing and equipment, if available, for persons conducting field work; and,
- 4) Pursue peer-reviewed publications of research, and/or insure the Service is acknowledged as a contributor in research conducted on the refuge by others.

### **Developing Refuge Step-down Plans**

Service planning policy identifies 25 step-down plans that may be applicable on any given refuge. We have identified the 10 plans below as the most relevant to this planning process, and we have prioritized their completion if they are not already developed for the CM Refuge Complex. Sections of the refuge Habitat Management Plan (HMP) which require public review are presented within this document and will be incorporated into the final version of the HMP within three years of CCP approval. We will also develop an Annual Habitat Work Plan (AHWP) and an Inventory and Monitoring Plan (IMP) as high priority step-down plans. These are described in more detail below. They will be modified and updated as new information is obtained so we can continue to keep them relevant. Completion of these plans supports all refuge goals.

The Integrated Pest Management, Chronic Wasting Disease and the Avian Influenza plans have recently been completed for the Refuge Complex which incorporates Eastern Neck Refuge. They are adopted as part of this CCP. In addition, each of the following plans will be completed for the entire CM Refuge Complex according the following schedule; with details on Eastern Neck Refuge incorporated therein:

- A Law Enforcement Plan; within 3 years of CCP approval
- Safety Plan; within 3 years of CCP approval

The following plans will be specific Eastern Neck Refuge plans and completed separately from the Refuge Complex plans.

- Fire Management Plan; within 3 years of CCP approval (see also appendix E—Fire Management Program Guidance)
- A Visitor Services Plan, within 3 years of CCP approval, and would incorporate previously approved hunting plans

- A HMP, within three years of CCP approval (see discussion immediately below, and discussion on NEPA requirements)
- An AHWP, annually and consistent with CCP approval (see discussion below)
- An IMP, within 5 years of CCP approval (see discussion below)

#### *Habitat Management Plan*

A Habitat Management Plan (HMP) is the requisite first step to achieving goals 1 and 2 and is the highest priority step-down plan to complete. The HMP will incorporate the CCP habitat objectives and will also identify “what, which, how, and when” actions and strategies will be implemented over the 15-year time frame to achieve those objectives. Specifically, the HMP will define management areas, treatment units, identify type or method of treatment, establish the timing for management actions, and define how we will measure success over the next 15 years. In this CCP, the goals, objectives, and list of strategies under each objective identify how we intend to manage habitats on the refuge. Both the CCP and HMP are based on current resource information, published research, and our own field experiences. Our methods, timing, and techniques will be updated as new, credible information becomes available. To facilitate our management, we will regularly maintain our GIS database, documenting any major vegetation changes on at least a 5 year basis. As appropriate, actions listed in “General Refuge Management” will be incorporated into the HMP.

#### *Annual Habitat Work Plan and Inventory and Monitoring Plan*

The AHWP and IMP are also priorities for completion with CCP approval. They support the HMP’s objectives by detailing annual activities and measuring our successes. The AHWP is generated each year from the HMP, and outlines specific management activities to occur in that year. The IMP will outline the methodology to assess whether our original assumptions and proposed management actions are, in fact, supporting our habitat and species objectives. Inventory and monitoring needs will be prioritized in the IMP. The results of inventories and monitoring will provide us with more information on the status of our natural resources and allow us to make more informed management decisions. Further, our ability to implement an adaptive management approach depends in large part on developing a monitoring program that allows us to learn about the impacts of our management actions, and then use those results to update knowledge and adjust management actions.

#### **Wildlife-Dependent Recreational Programs**



Jonathan Priddy/USFWS

*A young visitor admiring the office renovation*

The 1997 Refuge Improvement Act designated six wildlife-dependent priority public uses on National Wildlife Refuges: hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation. Per the General Guidelines for Wildlife-Dependent Recreation, Fish and Wildlife Service Manual, 605FW 1, we will strive to ensure that the wildlife-dependent recreation program:

- 1) Promotes safety of participants, other visitors, and facilities
- 2) Promotes compliance with applicable laws and regulations and responsible behavior
- 3) Minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan
- 4) Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation

- 5) Minimizes conflicts with neighboring landowners
- 6) Promotes accessibility and availability to a broad spectrum of the American people
- 7) Promotes resource stewardship and conservation
- 8) Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources
- 9) Provides reliable/reasonable opportunities to experience wildlife
- 10) Uses facilities that are accessible to people and blend into the natural setting
- 11) Uses visitor satisfaction to help to define and evaluate programs

In 2006, the Northeast Regional Visitor Services Review Team identified visitor programs of emphasis for each refuge. The two programs identified for this refuge are: wildlife observation and wildlife photography. This determination was based on careful consideration of the refuge's natural resources, predicted staff and operational funds, existing and potential facilities, and which programs we would be most effective in providing "quality" opportunities for visitors. While all of the priority public uses are important and offered to some degree on this refuge, wildlife observation and photography will receive greater emphasis when prioritizing refuge resources. As always, we look to our partners, Friends Group, and/or other volunteers to develop and assist with all refuge public use programs.

#### **Appropriateness and Compatibility Determinations**

Chapter 1 describes the requirements for appropriateness and compatibility determinations. Appendix B includes all the approved findings of appropriateness and compatibility determinations supporting the activities outlined in this CCP. We only allow activities determined appropriate and compatible to meet or facilitate refuge purposes, goals, and objectives.

##### *Activities Not Allowed*

We have received requests for non-priority, non-wildlife dependent activities that have never been allowed on this refuge. Activities evaluated by the refuge manager and determined not to be appropriate on refuge lands include: horseback riding, swimming, sunbathing, competitions or organized competitive group events (e.g. fishing tournaments, or dog trials), large group non-wildlife-dependent gatherings (e.g. weddings, family reunions, and other similar parties), berry picking, and geo-caching. Appendix B documents the refuge manager's decision on their appropriateness. Most of these activities are sufficiently provided elsewhere nearby on other ownerships, so the lack of access on the refuge does not eliminate the opportunity in the area. According to Service policy 603 FW 1, if the refuge manager determines a use is not appropriate, it can be denied without determining compatibility.

##### *Non-Priority Activities Allowed*

In addition to the six priority recreational and educational uses, we have determined that several other activities are appropriate and compatible on refuge lands under certain circumstances. They are research, cooperative farming, and the operation of the Ingleside Recreation Area by Kent County. Details on these activities can be found in appendix B.

*Special Use Permits*

Special Use Permits may be issued for specialized or unique activities allowed on National Wildlife Refuges. Each activity will be evaluated on a case by case basis to determine appropriateness and compatibility.

**Distributing Refuge Revenue Sharing Payments**

As we describe in chapter 3, we pay Kent County refuge revenue sharing payments based on the total acreage and the appraised value of refuge lands. These annual payments are calculated by formula determined by, and with funds appropriated by, Congress. We will continue those payments in accordance with the law, commensurate with changes in the appraised market value of refuge lands, or new appropriation levels dictated by Congress.

**Protecting Cultural Resources**

As a Federal land management agency, we are entrusted with the responsibility to locate and protect all historic resources, specifically archeological sites and historic structures eligible for, or listed in, the National Register of Historic Places. This applies not only to refuge lands, but also on lands affected by refuge activities, and includes any museum properties. As described in chapter 3, consultation with the Maryland SHPO indicates there are numerous recorded archeological sites within the refuge area. Considering the refuge's location on the Bay at the mouth of the Chester River with its outstanding fishing, shell-fishing and hunting opportunities, it is likely that additional prehistoric or historic sites may be located in the future. There is also the historic lodge (currently managed as refuge headquarters and Visitor Contact Station) which is eligible for listing on the National Register.

We will conduct an evaluation of the potential for our projects to impact archeological and historical resources, and will consult with the SHPO. This will be especially important for those projects that include moving or displacing soil. A pre-project evaluation of activities will ensure we comply with section 106 of the National Historic Preservation Act. That compliance may require any or all of the following: a State Historic Preservation Records survey, literature review, or field survey. We submitted this CCP for review to the SHPO. The results of that review are included in appendix G.

We will also continue to rehabilitate the lodge, which serves as both our headquarters and Visitor Contact Station, as described below in the section on "Facilities, Construction, and Maintenance." Enforcement against vandalism and looting will also continue. We will also continue to work with state and local historic societies and preservation offices to interpret cultural resources on the refuge, including the exhibits in the Visitor Contact Station and the Wickes' historical marker, and to explain the importance of protection and preservation of those resources.

**Adaptive Management**

We will employ an adaptive management approach for improving resource management by learning from management outcomes. In 2007, then Secretary of Interior Kempthorne issued Secretarial Order No. 3270 to provide guidance on policy and procedures for implementing adaptive management in departmental agencies. In response to that order, an intradepartmental working group developed a technical guidebook to assist managers and practitioners: "Adaptive Management: The U.S. Department of Interior, Technical Guide." It defines adaptive management, the conditions under which we should consider it, the process for implementing it in a structured framework, and evaluating its effectiveness (Williams et al., 2007). You may view the technical guidebook at <http://www.doi.gov/initiatives/AdaptiveManagement/documents.html>.

The guidebook provides the following operational definition for adaptive management:

*Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social and economic goals, increase scientific knowledge, and reduces tensions among stakeholders.*

Control of mile-a-minute on the refuge



This definition gives special emphasis to the uncertainty about management impacts, iterative learning to reduce uncertainty, and improved management as a result of learning. At the refuge level, monitoring management actions and outcomes, and key resources, will be very important to implementing an adaptive management process. Our grassland, invasive species, and integrated pest management activities are examples of refuge programs or activities where an adaptive management approach may be implemented.

The refuge manager will be responsible for changing management actions and strategies if they do not produce the desired conditions. Significant changes from what we present in this CCP may warrant additional NEPA analysis and public comment. Minor changes will not, but we will document them in our project evaluation or annual reports. Implementing an adaptive management approach supports all refuge goals.

### Additional NEPA Analysis

For all major Federal actions, NEPA requires the site-specific analysis and disclosure of their impacts, either in an environmental assessment (EA) or in an EIS. Most of the actions outlined here and fully analyzed in the draft CCP/EA were described in enough detail to comply with NEPA, and will not require additional environmental analysis. Although this is not an all-inclusive list, the following projects fall into this category: the HMP, including its cropland, grassland, and wetlands habitat management programs; biological inventories and monitoring; modifications to our public use programs, new visitor services infrastructure planned; and controlling invasive plants and animal pests.

The new shoreline protection or breakwater projects are examples of a major action we feel did not have a thorough enough analysis in the draft CCP/EA to comply with NEPA. As a result, additional analysis and public involvement will be necessary once a lead agency and site-specific proposals are developed. In addition, we will adhere to all federal and state requirements for obtaining authorizations or permits and for protecting jurisdictional wetlands required for national wildlife refuges.

## Refuge Goals, Objectives, and Strategies

### Introduction

This third part of the chapter describes the relationship between goals, objectives, and strategies and details the actions we plan to implement to achieve specific objectives. Each goal and objective includes a rationale to explain why we think it is important. Strategies listed under each objective identify specific actions to implement for meeting that objective and indicate when those actions will be undertaken.

### Relating Goals, Objectives, and Strategies

One of the earliest steps in developing this plan was to formulate refuge goals and subgoals: the intentionally broad, descriptive statements of the desired future condition of refuge resources. Goals and subgoals articulate the principal elements of refuge purposes and the vision statement, and provide a foundation for developing specific management objectives and strategies. By design, goals and subgoals are less quantitative and more prescriptive than their objectives in defining the targets of our management. Under each respective goal and subgoal we provide a rationale to clarify the conditions we are striving towards.

Our next step was to develop management objectives to help us meet those goals. Objectives are incremental steps toward achieving a goal; they also further define the management targets in measurable terms. They provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating our success. “Writing Refuge Management Goals and Objectives: A Handbook” (USFWS 2004b) recommends that objectives possess five properties to be “SMART”: (S) specific, (M) measurable, (A) achievable, (R) results-oriented, and (T) time-fixed.

A rationale accompanies each objective to explain its context and why we think it is important. This will help us determine how to measure our success in achieving each objective.

For each objective, we developed strategies: the combination of specific actions, tools, or techniques we may use to achieve that objective. Subsequent refuge step-down plans will help us further evaluate how, when, and where we should implement most of the strategies.

### GOAL 1

#### **Protect and enhance Service trust resources, and species and habitats of special concern in the Chesapeake Bay region.**

##### **Rationale for goal:**

Our highest priority over the next 15 years is to protect against additional refuge shoreline erosion and the loss of refuge tidal marsh. Shoreline and tidal marsh habitats are threatened by erosive forces and invasive species; nearby shallow waters and submerged aquatic vegetation (SAV) beds also face these threats and the impact of pollutants. The integrity of the refuge, and its ability to support both aquatic and terrestrial Federal trust species and habitats, depends on stemming shoreline, tidal marsh and SAV bed losses. The protection and monitoring of species that rely on these habitat areas, such as inter-jurisdictional fish, shellfish, and other aquatic species on the refuge, is an important part of this goal.

These habitat areas and others on the island also sustain nesting bald eagles, and a wide diversity of other migratory songbirds and waterfowl. Managing refuge habitats, as part of a regional partnership to sustain wintering populations of migratory waterfowl and contribute to North American Waterfowl Management

Plan population goals is another important aspect of this goal. The Upper Eastern Shore of the Bay has historically sustained the greatest concentrations of Atlantic Population (AP) Canada geese and other wintering waterfowl in the Atlantic Flyway. Wintering birds are attracted to the Chester River basin because of its extensive areas of brackish tidal marsh, open shallow water, and SAV beds. Eastern Neck Refuge, which is uniquely located in the lower Chester River basin and the only protected Federal land on the Upper Eastern Shore of the Bay, provides sanctuary, shelter from severe weather, and food to sustain these wintering waterfowl and other migratory birds. The rare tundra swan also winters in the shallow waters near the refuge.

Other Federal trust resources covered by this goal are the many archeological and cultural resources on refuge lands. The refuge's long history of pre-colonial and colonial uses has resulted in structures and sites eligible for the National Historic Register.

**SUBGOAL 1:** Maintain and restore the integrity of the refuge shoreline and nearshore environments to sustain Service trust resources and diverse natural communities.

**Rationale for subgoal:**

Sustaining a diversity of refuge habitats to support Service trust resources and other species of conservation concern depends on maintaining the integrity of the shoreline along Eastern Neck Island over the long term. Eastern Neck Island and its near-shore tidal wetland and shallow water environments are continually subject to the natural erosive forces of the Bay and Chester River, forces exacerbated by boat traffic, major storms, and sea level rise. Water pollutants from the greater Bay and Chester River watersheds threaten submerged aquatic vegetation (SAV) beds and other aquatic resources in general. The long-term success of our management efforts to sustain the trust species and diverse natural communities on the refuge depends upon actions we must make to maintain the integrity of these shoreline and near-shore environments. Actions to protect those areas on and near the refuge, in particular the eroding shoreline and tidal marshes, are the highest priority to implement on the refuge. Our strategies under objective 1.1.1 and objective 1.1.2 were developed with that priority in mind.

**Objective 1.1.1 (Shoreline Protection):**

Over the next 15 years, continue to protect approximately 8,700 feet total of western refuge shoreline from erosion by maintaining the existing offshore breakwaters (approximately 6,066 linear feet) and on-shore armoring (approximately 2,627 linear feet). In addition, protect approximately 28,000 feet total of southern, southwestern, and northern refuge shoreline from erosion by developing new shoreline protection projects.

**Basis for the Objective:**

The refuge has a history of severe shoreline erosion—between 1867 and 2005, the Island lost 291 acres of land to the Bay (Cronin 2005). In the late 1980s, the refuge's western shoreline retreated by as much as 10 feet per year. Unlike barrier islands along the coast that lose shoreline on one end but gain land on the other, when Chesapeake Bay islands erode, the material is lost to the Bay forever resulting in a direct, permanent loss of valuable wildlife habitat.

Refuge guts and creeks support and protect SAV beds critical to waterfowl, fisheries and other aquatic resources. The stability and integrity of the refuge shoreline is critical to maintaining the richness of these shallow water habitats.

In 1991, a project was implemented to construct erosion control structures consisting of five stone breakwaters (constructed of 1.5- to 3-ton<sup>2</sup> stones) along the refuge's western shore. The purpose of the breakwaters is to "break" or absorb wave energy before it reaches the beach. Offshore breakwaters of a given length generally protect a greater length of corresponding shoreline because of this wave energy damping effect. The project also involved installing on-shore stone rip-rap to armor the shoreline. Where bluffs are located along the shoreline, offshore breakwaters were constructed approximately 100 to 200 feet from shore. Offshore breakwaters are 75 feet long, six feet above mean high tide, and are placed 75 feet apart in a semi-circle.

Approximately 8,700 linear feet of severely eroding shoreline were protected between 1993 and 2000 by this project, which was finished in early 1993 at a final cost of \$2.75 million. In 2005, dredged material from Kent Narrows—a navigation channel of the Chester River—was deposited behind the breakwaters. Despite the success of the breakwater project, erosion continues to be a problem for Eastern Neck Island's remaining shoreline, especially the southern end.

Future restoration of the shoreline depends on securing funding for planning, design, implementation, and the availability of dredge material. Map 4.1 presents our recommended locations for new shoreline protection projects, with priority given to protecting the Hail Point area. We are very concerned that once the narrow land bridge connecting the island proper to Hail Point is breached, the Hail Point area will quickly erode and disappear. In 2009, a "living shoreline" project was initiated at Hail Cove, in cooperation with U.S. Army Corps of Engineers, MD DNR, Ducks Unlimited, Eastern Waterfowl Festival, and the National Aquarium, along with many funding partners. The objective is to reduce shoreline erosion and restore marsh and reef habitat. In early summer, low profile headland breakwaters were constructed to reduce wave energy. Sand was also placed along the existing shoreline to provide an environment suitable for bay grasses and emergent plants. Volunteers then planted marsh grasses to jump start grass establishment. The project will be closely monitored to evaluate whether more needs to be done in the Hail Point area, and whether the same project design could be used in other areas of the Bay.

While our concern with the loss of wildlife habitat is paramount, it is also important to recognize that shoreline loss threatens some of our visitor facilities and access points. As we develop shoreline protection or stabilization projects, we will consider how we can also safeguard those assets.

Between draft and final CCP, we added plans to expand the amount of refuge shoreline and tidal marsh protection (see also objective 1.1.2 below) to include another area of shoreline increasingly at risk. We added 3,000 feet along the refuge's northern boundary, including Tubby Cove, as an area of concern. Over the past few years, while developing this CCP, shoreline erosion and tidal marsh loss have become more apparent. We are concerned that our *Phragmites* control work close to shore is exacerbating shoreline decline in areas where it is actively eroding. While we do not prefer to retain an invasive, exotic species like *Phragmites*, this plant's deep root system anchors the plant well and helps buffer the shoreline from the erosive forces of wind and high wave action. In some areas, if we continue to remove *Phragmites* close to shore without having established native emergent vegetation or some other buffer, than open water may result with no protection for the shoreline. Retaining *Phragmites* along certain sections of the refuge's actively eroding shoreline may be the best option in the near-term for protecting that shoreline until more permanent measures are in place to stabilize and sustain native marsh development.

### Strategies

#### *Continue to:*

- 1) Work with existing partners, including the U.S. Army Corps of Engineers, U.S. EPA, Maryland DNR, National Aquarium in Baltimore, Eastern Waterfowl Festival, Kent County officials, and many corporate and funding partners to maintain and monitor the existing breakwaters, on-shore armoring projects, and living shoreline projects
- 2) Minimize public access to the refuge shoreline by restricting people to designated trails, especially in sensitive areas

#### *Begin within 3 years of CCP approval:*

- 3) Work with existing partners, and other experts, to conduct an extensive shoreline risk assessment to assist in prioritizing shoreline protection needs and to facilitate restoration proposal development; in particular, determine where *Phragmites* control work should be reduced or eliminated in the near-term because it is the only protection in place where the shoreline is actively eroding (e.g. Tubby Cove area). Develop a monitoring program to evaluate the effectiveness of this strategy
- 4) Work with existing Service partners, and continue to seek new ones, to prioritize, develop proposals, and obtain funding and required permits for new shoreline protection and restoration projects, with priority given to Hail Point protection
- 5) Establish a peer-reviewed monitoring protocol to use before and after restoration projects are implemented to be able to objectively evaluate success
- 6) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program

### **Objective 1.1.2 (Tidal Marsh Protection and Restoration):**

Over the next 15 years, manage the approximately 859 acres of existing brackish tidal marsh on refuge lands to ensure they are dominated (> 75% of area) by native species such as Olney three-square, saltmarsh bulrush, hightide bush, dwarf spikerush, black needlerush, switchgrass, and big cordgrass. In addition, implement plans to restore up to an additional 108 acres of brackish tidal marsh in conjunction with planned shoreline restoration projects to support trust resources including Virginia rail, horseshoe crab, marsh wren and wintering waterfowl.

#### **Basis for the objective:**

The refuge encompasses approximately 859 acres of brackish tidal marsh, comprised of native vegetation, such as Olney three-square, saltmarsh bulrush, hightide bush, dwarf spikerush, black needlerush, switchgrass, and big cordgrass. Unfortunately, *Phragmites* has also invaded some areas, outcompeting native vegetation. About 60 acres of open water exists as pockets interspersed in the larger matrix of tidal marsh vegetation within the refuge boundary, adding to the diversity of this habitat type. The tidal marsh is vital to the integrity of the refuge because it maintains freshwater flow and quality by moderating the effects of floods and droughts as well as filtering out nutrients and sediments. It also provides a buffer that absorbs a major portion of the erosive forces of tides and wave action on the refuge shoreline and uplands. Tidal marshes serve as nursery and spawning habitat for many species of fish and invertebrates, and a wintering area for waterfowl. To sustain these extremely important values, this objective, along with our objective to protect the refuge shoreline, is the highest priority for the refuge.

Besides the marsh grass restoration project, in recent years we have focused on learning more about breeding bird use of these wetlands. In particular, we have been interested in whether king rail, Virginia rail, and marsh wren are present and breeding. By conducting surveys, we can better understand what habitats individual species prefer on the refuge, their seasons of use, and what causes disturbances. This information will provide us a basis on which to make management decisions.

### Strategies

*Continue to:*

- 1) Work with existing partners, including U.S. Army Corps of Engineers, to place dredged material at specific restoration sites
- 2) Plant native marsh grasses, supported by volunteers and partners' funding as part of the shoreline restoration project
- 3) Conduct long-term monitoring of restoration activities in partnership with the National Aquarium in Baltimore, Friends of Eastern Neck and volunteers
- 4) Restrict public access to designated trails at Tidal Marsh Overlook Trail, Tubby Cove, Bayview Butterfly Trail, Boxes Point Trail, and Duck Inn Trail
- 5) Conduct waterfowl and secretive marsh bird surveys according to regional protocol

*Begin within 3 years of CCP approval:*

- 6) Continue the work with partners to plant native marsh grasses, but identify some dredge material areas to remain open to promote use by certain wildlife that prefer open sandy areas (e.g. diamondback terrapins, horseshoe crab, and native tiger beetles)
- 7) Ensure monitoring protocol is peer-reviewed and objectively evaluates success in restoration areas
- 8) Pursue marsh restoration project design and development in conjunction with shoreline protection measures under objective 1.1.1 above
- 9) Manage *Phragmites* and other exotic, invasive plants in marshes; however, in conjunction with shoreline protection strategies, determine where *Phragmites* control work should be reduced or eliminated in the near-term because it is the only protection in place where the shoreline is actively eroding (e.g. Tubby Cove area). Develop a monitoring program to evaluate the effectiveness of this strategy.
- 10) Use approved herbicides and prescribed burning where they are determined to be the most effective tools and implement according to annual plans
- 11) Initiate discussion with MD DNR about strategies to minimize activities occurring off refuge that are impacting tidal marshes
- 12) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

### Objective 1.1.3 (SAV Beds and Shallow Water Habitat Protection):

Over the next 15 years, manage refuge lands to ensure there is no contributing adverse impact to submerged aquatic vegetation beds, which are critical habitats for inter-jurisdictional fish and wintering waterfowl. Actively engage in inter-jurisdictional partnerships to protect water quality and restore at least 500 acres of beds and shallow water habitats in the lower Chester River Basin.



Lee Karney/USFWS

*Ruddy duck*

#### **Basis for the objective:**

The refuge is situated in the broadly extensive mesohaline estuaries portion of the Bay (MD DNR 2005). This habitat is defined as “Chesapeake Bay and Coastal Bays” tidal waters that normally range from 5 to 18 parts per thousand salinity. Because of the connection with upstream high productivity habitat, animal and plant biomass is quite high in these shallow waters. In addition, juvenile anadromous fish, summer migrants (e.g., weakfish, menhaden, bluefish), and developing blue crabs move into these habitat areas and bring additional biomass (see objective 1.4.1 for additional information on inter-jurisdictional fish conservation). Critical shallow water features created by plants and animals include SAV beds, clam and oyster beds, and bare mud, silt and/or sandy bottoms. Plant life may consist of macroalgae and 15 species of SAV, including widgeon grass, eelgrass, sago pondweed, wild celery, redhead grass, and sea lettuce. The distribution and abundance of flora varies with water clarity, nutrient loads and other factors. SAV play an important ecological role by providing habitat for small forage fish, shellfish, benthic surface and sub-surface assemblages, and as food for waterfowl. The Bay-wide decline in SAV distribution and abundance is considered to be a primary cause of the decline in those waterfowl populations that rely on aquatic habitats for food (Funderburk et al. 1991).

Historical estimates of the geographic extent of SAV beds supported by the Bay are estimated at greater than 200,000 acres. As of 2003, 70 percent of the bay grasses had been lost. Such declines can have a dramatic impact on wintering waterfowl populations. The restoration of SAV has long been an important goal of the Chesapeake Bay Program (CBP) and its partners. In 2003, MD DNR and its Bay partners proposed a new goal and strategy to accelerate the protection and restoration of SAV in the Chesapeake Bay and its tidal tributaries. The goal calls for the protection and restoration of 185,000 acres of bay grass by 2010.

SAV and shallow waters near the refuge also support a high diversity of waterbirds and waterfowl. A 2005 inventory by VIMS suggests that the refuge and immediately adjacent state waters support approximately 500 acres of SAV and clam beds. These waters provide foraging habitat for hundreds of avian species, including numerous species identified by the ACJV and MD DNR (2005) as conservation priorities. Wintering waterfowl and waterbirds such as American black duck, canvasback, redhead, loons and grebes depend heavily on the presence of SAV beds in portions of the bay in Maryland (ACJV 2009). Based on our weekly survey counts over the last 10 years, some 7,000 to 13,500 waterfowl, or a 10-year average of 10,000 waterfowl, stop over or winter in the lower Chester River basin on and near the refuge.

Species listed by the State of Maryland as of greatest conservation need (GCN) associated with shallow waters and SAV beds include the American black duck, bald eagle, brant, canvasback, ruddy duck, northern diamond-backed terrapin, American shad, and horseshoe crab. Management plans and conservation programs for waterfowl, game fish and shellfish are currently being implemented by MD DNR, the Service, and many other partners in the area (MD DNR 2005).

Among the many threats to these SAV beds and shallow water habitats are development, agriculture, oil and chemical spills, and other pollution sources. These sources include metalloids, changes in pH, thermal and toxic discharges, nutrients (especially nitrogen and phosphorus), and sedimentation that result in water quality degradation. Other human activities and recreation result in habitat degradation, and invasive non-native species.

Maryland’s recommended conservation actions for this estuarine environment include:

- 1) Reestablishing and conserving SAV beds in areas where they formerly occurred and where water quality has improved since their disappearance;
- 2) Developing land management plans which incorporate conservation measures into the local planning processes;
- 3) Initiating measures to protect, maintain, and improve all species habitats and populations through coordinated efforts with various programs, especially the Chesapeake Bay Program; and,
- 4) Implementing BMPs to reduce non-point source impacts and erosion control measures and promote the protection and preservation/restoration of aquatic/riparian communities.

An important land conservation measure for SAV protection and water quality improvement is the establishment of a naturally vegetated, forested buffer along the shoreline, separating human land uses and sensitive land and water resources (MD CAC 2007). The State of Maryland enacted the Critical Area Act requiring establishment of a minimum buffer of 100 feet of natural vegetation landward from the mean high water line of tidal waters, or the edge of tidal wetlands, and tributary streams. A forested buffer acts as a filter for the removal or reduction of sediment, nutrients, and toxic substances which enter adjacent waterways in land run-off. It also minimizes the adverse impact of human activities on habitat within the Critical Area. On the refuge, we would meet or exceed these forested buffer guidelines as part of our best management forestry practices.

We also use best management farming practices in our cropland management program to ensure that the quality of water runoff from the refuge does not impair SAV beds and other shallow water habitats. We maintain sediment basins and green waterways, and adhere to strict requirements, including a rigorous review by our Regional Contaminants Specialist, when using herbicides.

We do not have direct authority to manage the SAV beds or shallow water habitats of the lower Chester River Basin because refuge jurisdiction ends and state jurisdiction begins at the mean high waterline. However, we indirectly influence these environments through management activities on the refuge that affect the quality of water runoff into the Bay. Adhering to best management forestry and farming practices on refuge lands minimizes concerns with creating adverse impacts. We can also positively affect SAV beds and shallow water habitats by our participation in partnerships that contribute to water quality improvement and habitat restoration.

### Strategies

*Continue to:*

- 1) Monitor water quality every two weeks at Bogles Wharf, Butterfly Pond, Cedar Point Pond, and Headquarters Pond when volunteers are available
- 2) Implement best management farming and forestry practices, including the maintenance of grass and forested buffers, green waterways, and sediment basins; and, ensure we meet or exceed state forested buffer requirements
- 3) Support our partnerships dealing with water quality and marsh habitats in the lower Chester River Basin with Natural Resource Conservation Services (NRCS), the Chester River Association, the National Aquarium in Baltimore, Virginia Institute of Marine Science (VIMS), MD DNR, the Service's Chesapeake Bay Field Office, Ducks Unlimited (DU), the Chesapeake Bay Foundation, Army Corps of Engineers, and others

- 4) Work with MD DNR to manage mute swan populations in the vicinity of the Refuge.

*Begin within 1 year of CCP approval:*

- 5) Actively engage in the exchange of technical information, identifying showcase or demonstration projects, and/or supporting research to promote water quality improvement, SAV protection, and marsh restoration through partnerships with NRCS and Chester River Association, National Aquarium in Baltimore, Environmental Protection Agency, Army Corps of Engineers, VIMS, MD DNR, the Service's Chesapeake Bay Field Office, DU, the Chesapeake Bay Foundation, and other partners. Sponsoring expert meetings, workshops, conferences, research, and field visits are examples of ways to further engage partners. Use the Chesapeake Marshlands NWR Complex Annual Science forum as a venue.
- 6) Initiate discussion with MD DNR about management strategies to minimize activities that are impacting SAV beds and shallow water habitats

*Begin within 3 years of CCP approval:*

- 7) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

**SUBGOAL 2:** As part of a regional partnership to conserve Chesapeake Bay waterfowl, manage refuge habitats to help sustain wintering populations of migratory waterfowl in the lower Chester River basin and contribute to North American Waterfowl Management Plan population goals for the Chester River and Kent County Bayshore Focus Area.

**Rationale for subgoal:**

The Chester River and Kent County Bayshore Focus Area (see map 1.3) supports some of the most important wintering habitat in the state for American black duck and wintering geese according to the Atlantic Coast Joint Venture Focus Area Report (ACJV 2005). The refuge is the only protected land in the focus area, which encompasses about 275,000 acres from the Elk and Bohemia Rivers in the north to the mouth of the Chester River, including the Sassafras River and more than 40 named tributaries. The focus area is important for large numbers of wintering waterfowl and supports approximately 200,000 Atlantic Population (AP) Canada geese. Waterfowl hunting is the second or third most important industry in the area, although it is not allowed on the refuge (USFWS 2008b).

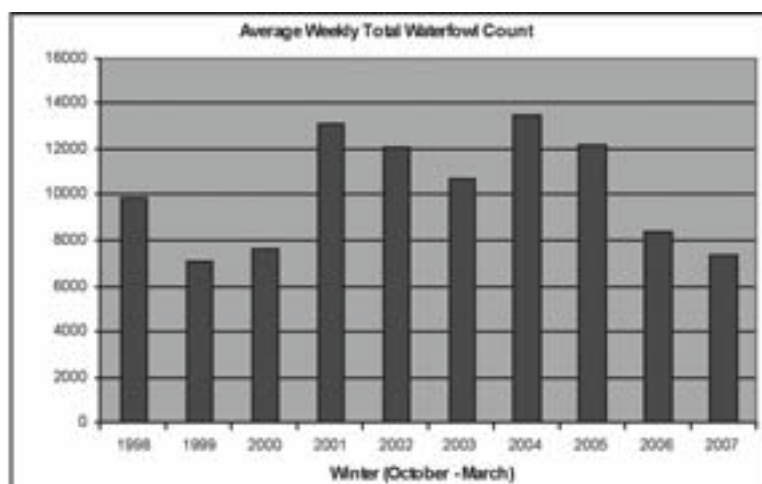
The ACJV focus area supports important SAV beds critical to breeding and wintering waterfowl in the Atlantic Flyway. Approximately one third of Maryland's population of American black duck (about 6,000) utilizes the focus area and, as stated above, it is also an important area for wintering geese. It is also an important area for wintering scaup and up to 120,000 individuals have been recorded. As a recent indication of the numbers of waterfowl species wintering in the focus area, the 2003 survey counted 196,000 AP Canada geese, 38,800 snow geese, 18,000 scaup (114,000 during 2002 surveys), 14,200 canvasback, 10,300 mallards, 4,000 American black ducks, 3,800 ruddy ducks, 1,500 merganser, 800 tundra swans (2,300 in 2002), 400 bufflehead, 300 ring-necked duck, 300 mute swan, and 100 common goldeneye (ACJV 2005).

More recent information available on the use of the area from 2004 to 2007 Midwinter Waterfowl Survey (MWWS) data reinforces the importance of the Chester River Basin. The MWWS is conducted at the same time each winter in each state in the Atlantic Flyway, from Maine to Florida. When pooled with the results from other states, the survey provides a long-term measure of the

distribution and population size for waterfowl species wintering in the Atlantic Flyway. It is especially helpful in tracking the population size of Eastern population tundra swans and Atlantic brant for which breeding ground surveys have not been done. The following excerpts from the survey show the importance of the lower Chester River Basin to Maryland wintering waterfowl.

From the 2007 MWWS: The survey was flown between December 27, 2006 and January 4, 2007. A total of 478,900 birds were counted in the lower Chester River Basin, which was a substantial decrease from last year's count of 577,100. This year tributaries and bays along the Chesapeake were completely ice-free. Since the Maryland Midwinter Waterfowl Survey only covers the tidal, estuarine waters, it is likely that many ducks and geese remained inland on open freshwater reservoirs, lakes and ponds that are normally ice covered.

From the 2006 MWWS: The largest concentrations of mallards were observed in the lower Chester River, downriver of Chestertown. Large numbers of scaup were observed on the lower Chester River, Langford Creek, and the mouth of the Northeast River on the Eastern Shore. Canada geese this year numbered 305,400; 20 percent lower than the 383,400 geese observed in 2005. Mild weather contributed to Canada geese and other waterfowl being located inland from the Bay on freshwater ponds, unlike survey conditions in 2005 when ponds were frozen and geese were concentrated along rivers and Chesapeake Bay. Inland areas in Cecil, Kent, and Queen Anne's Counties that contain substantial numbers of wintering geese are no longer surveyed. Because midwinter estimates reflect a mix of resident and migrant Canada goose stocks, these survey estimates are no longer used to guide hunting regulations. Regulations change in accord with the population status of Atlantic and Resident Populations of Canada geese, which are tracked using breeding population and productivity surveys conducted each spring.



**Figure 4.1 Average total waterfowl numbers seen in weekly winter surveys in the vicinity of Eastern Neck Refuge**

From the 2005 MWWS: Total dabbling ducks in the lower Chester River Basin survey were estimated at 82,800; a decrease from 94,300 in 2004. Mallards this year increased to 52,800, up from the 48,200 counted in 2004.

Large numbers of mallards were observed in the lower Chester River, downstream of Chestertown. Large numbers of scaup were observed on the lower Chester River and the mouth of the Northeast River on the Eastern Shore.

The refuge, and the immediately adjacent lower Chester River, hosts thousands of waterfowl every year. Weekly October to March refuge survey data from the past decade (figure 3.1) indicates the average numbers of waterfowl of all species seen on the refuge, and in its immediate vicinity, range from 7,000 to nearly 14,000 birds.

Our management of the refuge contributes to enhancing the area for wintering and migratory waterfowl, shorebirds, and waterbirds. The refuge croplands, green tree reservoirs, moist soil management units, and ponds provides sanctuary, feeding and resting areas, and protection from severe winter weather for many species of wintering waterfowl, as well as food and cover for those waterfowl, shorebirds, and waterbirds migrating through.

**Objective 1.2.1 (Cropland Management for Waterfowl):**

Over the next 15 years, provide a high energy forage source and protection from human disturbance on refuge lands, primarily for wintering Atlantic Population Canada geese and American black duck, and for other wintering and migratory waterfowl. Achieve this by consolidating approximately 403 acres of the most productive cropland fields, and enhancing the quality, quantity, and availability of forage in those fields.

**Basis of the objective:**

The lower Chester River Basin, including the refuge, historically has been extremely important to migrating and wintering AP Canada geese. The species has been a focus of management since the mid-1940s. The Chesapeake Waterfowl Management Plan, the North American Waterfowl Management Plan, and the Canada Goose Management Plan for Maryland recognize the importance of the refuge in managing for this species. The Chester River winters over 100,000 AP Canada geese, more than any other area on the East Coast — and thousands utilize the refuge, which offers sustenance as well as sanctuary (USFWS 2003a).

Over the last decade, we averaged about 1,800 AP Canada geese per day using refuge croplands in weekly October to March surveys, with as many as 5,000 geese counted on a single field on one survey day. The fields are also used occasionally by American black ducks and mallards, and recently, tundra swans have been seen using the fields.

We believe that active management of croplands is integral to achieving this objective for the foreseeable future. According to Bill Harvey, waterfowl expert with MD DNR, the refuge makes a significant contribution to conserving the regional waterfowl population by providing them a sanctuary during the intensive Chesapeake Bay waterfowl hunting season, coupled with having readily accessible high energy forage available at the same time (Harvey, personal communication 2009). The refuge's croplands can also be very important to the region's migratory waterfowl during harsh winters when croplands on private farm fields have been harvested and the ground and water are frozen. The crops planted are rich in carbohydrates that help sustain the bird's energy reserves during extreme conditions. Year round, the refuge's croplands supplement the natural foods provided in tidal marshes, SAV beds, and other shallow water habitats. Unfortunately, these natural food sources have been severely compromised, if not lost, over past decades and their availability to waterfowl has greatly diminished. We previously discussed the many conservation partners working to restore these shallow water habitats in the Bay, but this will take some time to reach levels recommended in the Chesapeake Bay Program's plan.

We will continue to evaluate the need for, and extent of, our cropland program as natural food sources are increased through restoration activities.

We will strive to make a more efficient and effective field operation without diminishing the value of the refuge to wintering and migrating waterfowl in the region. We plan to maintain only those fields that have consistent high waterfowl use, enhance our moist soil unit sites (see objective 1.2.2 below), and/or offer a quality, roadside wildlife viewing opportunity. This change will result in an overall reduction of cropland acres from the existing 557 acres to approximately 403 acres. However, we will also leave more grain in the fields than is currently being left (approximately 20% under present management), and we will annually evaluate the crop rotation in each field to determine the best combination given existing or predicted environmental conditions. In addition to our plans to leave considerably more grain standing in the fields, we plan to leave it up later in the winter to provide forage when most other fields in the region are depleted. We also plan to remove some hedgerows and create larger fields to improve management efficiency and increase interior field habitat which geese tend to prefer over edge habitat. Certain other hedgerows will remain in place, as depicted on map 4.1, to protect fields from soil loss due to wind and storm events, contribute to wildlife habitat diversity, and facilitate quality, roadside wildlife viewing opportunities.

We will also conduct an objective, peer-reviewed study to evaluate the refuge's cropland management program, in conjunction with our successes in tidal marsh and SAV bed restoration. There have been discussions within our agency about the value and importance of farming on refuges to meet management objectives. An adaptive management process will be implemented to provide guidance for refuge decisions on the best management options for providing habitat for wintering waterfowl.

Wintering waterfowl will also benefit as we continue our partnership activities, as described in Objective 1.1.3, to help protect SAV beds, tidal marsh, and other shallow water habitat near the refuge and elsewhere in the lower Chester River basin.

### *Strategies*

#### *Continue to:*

- 1) Use cooperative farming as a tool for maintaining and managing croplands; make annual adjustments through the Cooperative Farming Agreement
- 2) Employ sustainable, best-management farming practices that prevent sediment, chemical, and nutrient runoff into the Chesapeake Bay, including the use of:
  - a) Crop rotation
  - b) Cover crops
  - c) No-till planting
  - d) Grass waterways and field borders
  - e) Nitrogen-fixing, weed-controlling crops to reduce the need for chemical fertilizers and herbicides
  - f) Soil testing and addition of soil amendments when needed
  - g) Riparian and shoreline buffer zones
- 3) Limit chemical treatments on the refuge to only the minimum level needed to meet objectives and only use those approved for use on the refuge
- 4) Maintain croplands through regular soil testing, the addition of soil amendments, and best management farming practices, including developing and utilizing an Integrated Pest Management Plan

- 5) Exclude the public from accessing cropland fields during winter to minimize disturbance to wintering waterfowl
- 6) Maintain closure of Ingleside Recreation Area and access road from October 1 to March 31 each year to minimize disturbance to waterfowl. The only exception is allowing access to designated areas during refuge hunts
- 7) Conduct weekly ground-based waterfowl surveys from October to March on refuge and the surrounding water
- 8) Prohibit hunting of waterfowl on refuge lands

*Begin within 3 years of CCP approval:*

- 9) Initiate the cropland field reduction and consolidation as depicted on map 4.1, including removal of certain hedgerows
- 10) Complete an evaluation and analysis of methods for managing cropland fields in an effort to determine what combination of actions would best meet our waterfowl goals over the long-term on the reduced cropland acreage. Consideration would be given as to the balance among or between cooperative farming, force account work, and contracting, and determining what is practicable, sustainable, and efficient. The evaluation would also result in a detailed implementation plan that would be incorporated into the HMP, and annual HWP as appropriate. A new compatibility determination for cooperative farming would be developed, if appropriate, reflecting any changes in that economic activity.
- 11) Coordinate with the Regional Biologist and waterfowl experts to establish a more rigorous survey protocol to assess waterfowl use in crop fields at various times throughout the year
- 12) Develop and utilize an Integrated Pest Management Plan
- 13) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

**Objective 1.2.2 (Moist Soil Units for Waterfowl and Other Birds):**

Over the next 15 years, provide resting areas and high value forage (e.g. smartweed spp., millet, bidens, spikerush and sedge spp.), primarily for wintering and migrating waterfowl such as American black ducks, mallards, pintail, widgeon, and wood ducks, but also for other migrating birds, by maintaining six moist soil management units comprising 50.5 refuge acres. Water levels in two of the moist soil units (approximately 28.4 acres total) would be seasonally managed by manipulating water control gates each year. In the other four moist soil units (approximately 22.1 acres total), water control gates would remain in place throughout the year and water levels would be influenced primarily by natural fluctuations in precipitation and groundwater.

General management purposes and objectives for individual units by season follow:

**Headquarters Pond Impoundment (seasonally managed; approximately 10 acres)**

This impoundment lies above, but connected to a pond which was formed when the road (into the original refuge headquarters) was constructed over 30 years ago in conjunction with the planned Cape Chester Housing development. A portion of the road forms the pond dike, which contains a stop-log type water control structure and allows for the seasonal control of water levels described below.

- a. Spring (March–April) Migrating Waterfowl: Provide approximately 10 acres of resting and feeding habitat, consisting of remnants of the previous growing season, such as mixed annual and perennial marsh vegetation. When at full pool level (6 feet) the surrounding hardwood forest, which is dominated by species of gums and oaks, would also be flooded providing up to an additional acre of habitat.
- b. Spring (April–June) Migrating Shorebirds, Marsh and Wading Birds: Begin a gradual drawdown by early to mid-April to provide exposed mudflats for foraging shorebirds, marsh and wading birds.
  1. By May, provide approximately 8 acres of feeding habitat consisting of shallow water (<6 inches deep) to mudflat habitat with sparse to no vegetation (<15% coverage), during the normal peak shorebird migration of early to mid-May. Encourage the production of invertebrates for shorebird food by drawing the water off slowly and concentrating invertebrates in shallow water wetlands and exposed mudflats.
  2. By early June, manage water control gates to reach the desired water level of 3.0 to 3.5 feet in the pond for the annual Youth Fishing Derby held in mid-June.
- c. Summer (July–August) Wading and Marsh Birds: During July through August, provide between 1-3 acres of quality feeding habitat for wading and marsh birds. This habitat would consist of open, shallow water (2-10 inches deep) with patches of emergent wetland plants that support fish, invertebrates and amphibians. Highest quality areas are those patches where prey is concentrated following water drawdown.
- d. Fall (September–October) Migrating Waterfowl: Close water control structure by early September. This impoundment is dependent on rainfall and the quantity and timing of autumn rain accumulation will dictate how much desirable habitat would be present at the time most migratory waterfowl arrive in October and November.
- e. Winter (November–February) Waterfowl: Provide approximately 10 acres of resting and feeding habitat consisting of shallow flooded (<12 inches water depth) moist soil vegetation dominated principally by large-seeded perennial, and smaller seeded annual, marsh plants (e.g. sedges, rushes, smartweeds, and three-square, mixed with smaller areas of moist-soil annual plants, beggar's ticks, wild millets, and submerged aquatic vegetation). If the pool level is high enough, an additional acre of adjacent flooded hardwoods will also be provided.

**Shipyard Creek Impoundment (seasonally managed; total area approximately 18.4 acres flooded portion, 7 acres)**

- a. Spring (March–April) Migrating Waterfowl: Same as above, on 7 acres.
- b. Spring (April–June) Migrating Shorebirds, Marsh and Wading Birds: Same as above, on 7 acres.
- c. Summer (July–August) Wading and Marsh Birds: Same as above, on 7 acres.
- d. Fall (September–October) Migrating Waterfowl: Same as above.
- e. Wintering (November–February) Waterfowl: Same as above, on 7 acres.

**Other Moist Soil Units (Low maintenance; 4 units; approximately 22.1 acres total)**

Up to four impoundments would have water control structures in place for potential management capability; however, they would not be manipulated except during emergency situations. The water control structures would remain closed throughout the year, allowing water to collect naturally from autumn precipitation and dissipate through soil percolation, transpiration, and evaporation throughout the rest of the year. While the quantity and timing of available water will vary each year with natural precipitation, the intent is for the peak amounts to occur to provide valuable waterfowl habitat during migration and winter. These habitat units would consist of shallow, flooded areas with mixed annual and perennial marsh vegetation dominated by smartweeds, sedges, and grasses. They would be surrounded by up to approximately 5 feet of grassy buffer adjacent to croplands.

*Basis of the objective:*

Native herbaceous vegetation (i.e. smartweed and various rushes and sedges) adapted to germination in hydric soils (i.e., moist-soil plants) provide waterfowl with nutritional resources, including essential amino acids, vitamins, and minerals that occur only in small amounts or are absent in other foods. These elements are essential for waterfowl to successfully complete aspects of the annual cycle such as molt and reproduction. Moist-soil vegetation also has the advantages of consistent production of foods across years with varying water availability, low management costs, high tolerance to diverse environmental conditions, and low deterioration rates of seeds after flooding.

Moist soil management units (MSUs) also promote invertebrate production. Invertebrates provide the critical protein-rich food resources required by pre-breeding and breeding female ducks, newly hatched waterfowl, and molting ducks and shorebirds. Peak use of the refuge's MSUs by waterfowl as indicated by the highest numbers seen on any winter survey day in our refuge ground surveys over the last decade has been 800 American black duck, 1,150 mallards, 39 teal, and 35 wood ducks. Due to the high value of these MSUs to waterfowl, we will manage them to maximize their benefit and minimize the occurrence of unwanted or invasive plants.

We will increase the number and distribution of MSUs by three over what we have today, which we expect will also improve the diversity of waterfowl using the refuge. In our professional judgment, this modest expansion plan represents the best and most realistic program to implement over the next 15 years, given our other habitat priorities. Additionally, our recent field review of potential MSU sites indicates that the island's soils and topography does not lend itself to the construction of extensive MSU complexes. The slope of the island increases the cost of construction and maintenance, and we do not support development of numerous, small, inefficient units which are much more expensive to maintain on a cost/acre basis. We believe it is most important to evaluate, and if needed, improve on the structures we have in place, while implementing this modest expansion, to insure we are developing the most effective and efficient designs. If our monitoring over the next 15 years indicates a high resource value, a further expansion of MSU's could be evaluated during development of the next CCP.

We have tentatively identified locations for the proposed three new units on map 4.1. These locations are based on preliminary field reviews conducted with partners. They are subject to change, or elimination from consideration, after we conduct more detailed field reviews evaluating feasibility and resource impact. For example, soils and engineering testing, an archeological and historic site survey, and a cost/benefit evaluation will be conducted as needed. To address concerns about potential concentrations of lead or other contaminants in the soil or water from past uses including hunting and farming, we would conduct

contaminant sampling and analysis in and around the units at existing and future constructed sites. If concerns arise, we would address each situation as soon as possible in a manner that provides the least impact to wildlife, and protects the health and safety of both wildlife and humans.

### Strategies

*Continue to:*

- 1) Actively manage Shipyard Creek and Headquarters Pond MSU water levels seasonally as indicated by the objective statement above.
- 2) Allow the low maintenance MSU to fill with rainwater in the fall/winter and gradually de-water in the spring/summer; intervene in this process only when management objectives are compromised
- 3) Annually maintain, repair, or replace water control structures as needed to support management objectives
- 4) Monitor waterfowl use of MSUs as part of the weekly October to March ground surveys

*Within 3 years of CCP approval:*

- 5) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)
- 6) Coordinate with the Regional Biologist, MD DNR, and other waterfowl experts and partners to establish a more definitive survey protocol to assess year round waterfowl and other wildlife use of MSUs, especially at the Shipyard Creek location; use collected data to see if use corresponds to stated management objective. Also, utilize this information to learn from this project to help refine design and management for new MSUs.

*Begin within 5 years of CCP approval:*

- 7) Complete design and construction of up to 3 new MSUs after positive results from: engineering and soils field reviews, including feasibility studies; archeological and historic surveys recommended by the Service's Regional Archeologist or State SHPO; cost/benefit analysis; and funding forecasts
- 8) Initiate a regular program of analyzing water quality and soils in and surrounding moist soil units

### **Objective 1.2.3 (Green Tree Reservoirs for Waterfowl):**

Over the next 15 years, enhance management of the five existing green tree reservoirs on the refuge (approximately 38 acres total) primarily to provide foraging and resting areas for wintering waterfowl, including American black duck, mallards, teal, and wood ducks. General management purposes and objectives by season follow:

- a) Fall (Early October) Migrating Waterfowl: Close water control structures by early October (approximately) in anticipation of peak waterfowl migration in November. This would be dictated by the quantity, timing, and accumulation of autumn rains. Water levels would be held between 1 to 18 inches to promote invertebrate production, and allow waterfowl to fully utilize mast and seeds on the ground.
- b) Spring (Late February–Early March) Migrating Waterfowl: Begin gradual drawdown of impounded water, targeting de-watering to be completed by the time trees break out of dormancy and when the majority of migratory waterfowl have left.

*Basis of the objective:*

A green-tree reservoir (GTR) is a forested lowland that is temporarily flooded during the fall and winter to attract ducks, mainly mallards and wood ducks, and to some extent, American black duck and teal. Control structures allow water levels to be manipulated. Typically, water is held in the impoundment during the late fall and winter, while the trees are dormant, but also when waterfowl are present and can forage on hard and soft mast detritus and macro-invertebrates. Winter flooding during the dormant season avoids permanent tree damage and possible tree loss. The reservoirs are dominated by oak and gum species such as swamp chestnut oak, sweet gum, and black gum. The GTRs are rotated through a dry period each season to imitate the natural flood regime of forested wetland habitats. Typically, we are actively managing three reservoirs each year.

As we mentioned, the primary source of water for these GTR's is natural precipitation. While the quantity and timing of available water will vary each year, the peak amounts would coincide with highest waterfowl counts during migration and winter. GTR #2, does have a pump attached to a deep well on the refuge. However, refuge staff have determined that use of this pump is not worth the time, effort and cost of fuel to fill the reservoir unless an emergency situation exists. There are also concerns that pumping could adversely affect the amount and distribution of groundwater on this island, especially in a droughty year. In fact, using the pump has been a rare situation—it has only operated once in the last seven years.

Numbers of waterfowl using the GTRs on refuge lands is not necessarily impressive, but in our professional judgment, the numbers alone do not reflect their habitat value. Peak numbers of 80 American black ducks, 400 mallards, and 80 wood ducks have used the reservoirs based on the highest single day count over the last decade. These low numbers may be a result of actual low waterfowl use or they may simply reflect a less than optimal survey protocol. Our current protocol has the reservoirs surveyed from their periphery; surveyors do not typically venture into the interior of the wetlands because of the difficulty of access. We suspect we are missing a number of birds using the core area.

Within five years of CCP approval, our focus will be on monitoring wildlife use and management capabilities of the GTRs to more definitively evaluate their value to waterfowl and other wildlife. We suspect that these GTR areas may be more valuable during winter and early spring, versus during fall migration. In addition, we plan to revise our survey methods to better evaluate waterfowl use in the core of the flooded areas. We also need to determine whether each of the reservoirs can offer quality habitat without major resource investments. One evaluation is whether the native tree species mix in these areas are the most effective. Once we have better information on waterfowl use and habitat values between the reservoirs, we can determine if management should be discontinued for some, or all, of the GTRs, and/or which reservoirs need improvements to optimize management capabilities. A decision whether to remove the pump in GTR #2 would be included as part of this evaluation.

**Strategies**

*Continue to:*

- 1) Manage seasonal water levels in the reservoirs as described in the management objective and in the “basis for the objective”
- 2) Conduct waterfowl ground survey October–March

*Within 1 year of CCP approval:*

- 3) Coordinate with the Regional Biologists, MD DNR and other partners and experts to modify the waterfowl ground survey protocol to obtain a more accurate count of waterfowl using the interior of the GTRs

*Begin within 3 years of CCP approval:*

- 4) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

*Begin within 5 years of CCP approval:*

- 5) With the results from the wildlife use survey, complete a rigorous evaluation of each GTR to determine whether the level of waterfowl and other wildlife use merits the investment of staff, and operations and maintenance funds; determine whether to continue management and maintenance of equipment, and/or to continue the rotational management currently used. Specifically, determine whether to remove, or more effectively utilize, the pump in GTR #2. Also, as part of the evaluation, determine whether the water holding capacity of the soils in each GTR, and the tree species composition, reduce its potential long-term value to wildlife.
- 6) Develop and implement a schedule for conducting a contaminant analysis of the water and soils within each GTR

**Objective 1.2.4 (Tundra Swan Protection and Conservation):**

Over the next 15 years, continue to support partner efforts to sustain at least 2,500 wintering tundra swans annually in the lower Chester River's shallow water habitats, which includes restoring at least 500 acres of SAV and clam beds near the refuge.

**Basis of the objective:**

Until recently, the Chesapeake Bay was the most important wintering area on the Atlantic Coast for tundra swans. During the late 1960s, more than 40,000 tundra swans wintered on the Bay. But today, more than half of the tundra swan population along the Atlantic Coast winters in North Carolina (Reshetiloff 1995). The decline of SAV beds throughout the Bay area is believed to be the cause of the southern shift of wintering tundra swans. The preferred foods of wintering tundra swans are the tubers, roots and leaves of SAV and marsh plants. As the grasses disappeared during the 1970s, tundra swans, like many other waterfowl, began feeding in farm fields on waste grains, such as corn and soybeans, as well as winter wheat and barley.

Tundra swans nest in Alaska and Canada and migrate to Chesapeake Bay to spend the winter. While tundra swans wintering along the east coast (e.g., adjacent states of Pennsylvania, Virginia and North Carolina) have increased during the past two decades, tundra swans wintering in Maryland have declined about 40% during the past 25 years. Invasive, exotic mute swans have been implicated in this decline. Maryland has the largest population of mute swans in the Atlantic flyway. There is growing concern among wildlife managers that the increase in mute swans in Maryland is contributing to factors that have suppressed population growth among tundra swans wintering in Maryland (Mute Swans in Maryland: A Statewide Management Plan (MD DNR 2003a).

The guts, creeks, and coves surrounding Eastern Neck Island are important staging areas for wintering tundra swans. According to the National Audubon Society, the refuge supports approximately 1% of the Global tundra swan population. Our objective strives to support on-going efforts to restore the natural food sources for tundra swans rather than attempt to provide additional cropland-based foods. Through these partnerships and associated efforts, other

waterfowl which use shallow waters to feed will also benefit. This objective, while focused on tundra swans, is consistent with, and supported by goal 1, subgoal 1, objective 1.1.3 (SAV Beds and Shallow Water Habitat Protection).

### **Strategies**

*Continue to:*

- 1) Assist in maintaining an estimated 500 acres of SAV and clam beds around the island (VIMS 2005) by working in partnership with MD DNR and other organizations
- 2) Control mute swan in cooperation with MD DNR and according to their state mute swan control plan
- 3) Support partner's research efforts of tundra swan populations and use of habitat, including work with National Audubon Society, MD DNR, and other partners interested in tundra swan

*Within 1 year of CCP approval we would:*

- 4) Initiate discussion with MD DNR about management strategies to minimize activities that are impacting SAV beds and other aquatic habitats. This would include reducing disturbance to resting and feeding tundra swans and other waterfowl.

**SUBGOAL 3:** Manage a variety of upland habitats on the refuge to continue to support the rich diversity of songbirds, raptors, butterflies, and other native wildlife.

### **Rationale for subgoal:**

In 2002 the Service published a compilation of lists of migratory and non-migratory birds of the United States and its territories that are of conservation concern (USFWS 2002a). The lists were compiled at the national, Service-regional, and bird conservation regional (BCR) level and designed to stimulate coordinated and proactive conservation actions among Federal, State, and private partners. Causes for the concerns may be population declines, naturally small ranges or population sizes, threats to habitat, or other factors. Bird species considered for inclusion on lists included non-game birds, game birds without hunting seasons, and Endangered Species Act candidate, proposed endangered or threatened, and recently delisted species. The Service listed 32 species as birds of conservation concern (BCC) in the New England/Mid-Atlantic Coast Bird Conservation Region (BCR 30) (USFWS 2002a). The recently delisted bald eagle expands the list to 33 species. Eighteen of the 33 species are known to occur at Eastern Neck (appendix A) with eight of those seen only rarely and three, the marsh wren, wood thrush, and Baltimore oriole, known to breed here. An additional 15 species that breed at Eastern Neck Refuge are listed by Partners in Flight (Watts 1999) or by the Chesapeake Bay Critical Area (CBCA) Program (Jones et al. 2001) as birds of conservation concern.

In addition to the bald eagle and the BCC-listed peregrine falcon and short-eared owl, the refuge lists 19 other raptors observed here. Eight raptors breed at the refuge: bald eagle, osprey, black and turkey vultures, red-tailed hawk, common barn owl, eastern screech owl, barred owl, and great-horned owl. (USFWS 2006b)

Eastern Neck Refuge also hosts a variety of breeding and migrating butterfly species. Of particular note is the fall migration of Monarch butterflies, which have been observed by the thousands at the southern point of the refuge (Hail Point) where they rest before continuing to cross the Bay on their 2,000 mile migratory flight to Mexico. Other butterflies, such as the black swallowtail, tiger

swallowtail, cabbage white, Eastern-tailed blue, and other pollinators, as well as dragonflies and damselflies benefit from the grassland areas on the refuge and the BayScape garden which serves as their breeding area. Management efforts would focus on conserving productive habitat and preventing disturbance of the Monarch butterfly's resting at Hail Point.

Below we discuss objectives for managing forest and grassland habitats and present our reasons for doing so. We do not have a shrub habitat objective, despite several migratory shrub-dependent birds in this area listed as species of concern. Managing permanent shrub habitat in an amount and distribution on the refuge to make an important contribution to migratory birds would be a challenge. Our biggest concern is the likelihood that invasive plants would be a constant problem. Also, sustaining vegetation in a shrub stage would also require fairly frequent stand manipulations as vegetation on the refuge tends to transition to trees within five years without active intervention. At this time, we do not believe this is the best use of our staff and resources.

**Objective 1.3.1 (Forest Habitat Management):**

Over the next 15 years, manage approximately 853 acres of mature deciduous-mixed forest habitat on the refuge with a diverse canopy structure. At least 75 percent of the acreage would be in contiguous, un-fragmented blocks of at least 25 acres of native forest, with at least two of those blocks exceeding 100 acres each. The management emphasis is to provide stopover areas for forest-dependent migratory songbirds, and additionally provide nesting habitat for birds of high conservation concern, such as wood thrush, and eastern wood peewee, and nesting and migratory raptors.

**Basis of the objective:**

Within BCR 30, forested upland communities provide habitat for the second highest number of priority bird species in the region (USFWS 2007b). Coastal forests and woodlands are crucial as migratory stops for Neotropical migrants. Historically, the coastal communities were dominated by contiguous forest. Today, these forests have become highly fragmented by 300 years of land clearing, agriculture, and human development (TNC 2006). Destruction and fragmentation of forests in both breeding and wintering areas are factors in forest bird species declining abundance (Roth et al. 1996). Many of the declining forest birds are also associated with dense understory conditions created by local disturbance; such conditions have become less common due to lack of forest management and over-browsing by white-tailed deer (Rich et al. 2004).

Of particular concern in forest habitats is the decline of forest interior dwelling (FIDs) Neotropical migratory birds which require large contiguous forested tracts to maintain viable populations. A minimum habitat patch size is considered to be at least 50 acres in size with 10 or more acres of "forest interior" habitat (i.e., forest greater than 300 feet from the nearest forest edge). This minimum habitat patch size would only be capable of supporting less area-sensitive FIDs species. The larger the contiguous forest patch, the higher the probability of supporting productive breeding pairs.

Among a number of management recommendations made by ACJV in the BCR 30 for forest birds are:

- Increase/improve active management of forests to improve habitat quality within existing and high priority upland forest (e.g., loss of shrub layer). For example, promote uneven-aged management, thinning to open canopies, etc...
- Manage upland forest communities to provide post-fledging habitat (habitat mosaic, including shrubby areas and openings). Targeted species: wood thrush

- Develop and implement programs to control invasive plant species.

Our ability to manage for viable populations of those breeding FIDs and other forest-dependent birds of conservation concern that require contiguous forest tracts over 100+ acres is limited on the refuge given the current and projected distribution of interior forest habitat. That determination is coupled with the fact the refuge is an island, and lies within a regional landscape matrix dominated by agricultural lands (Dettmers, personal communication 2006). Simply put, there are not enough breeding birds in the area to exchange and sustain a healthy population. However, we do believe refuge lands could make an important contribution to the regional bird populations of such species as wood thrush, and eastern wood peewee. The wood thrush is a highest priority species for conservation concern and the eastern wood peewee is a high priority in PIF Area 44 (Watts 1999).

The wood thrush breeds in the interior and edges of deciduous and mixed forests, generally in cool, moist sites, and often near water. Research results indicate that wood thrushes choose habitats based more on the structure of the forest than on the degree of forest fragmentation in the landscape. Their nest is usually on the lower limbs of a tree or shrub. Since these birds forage on the ground, nest near the ground in a well-developed understory, and are sensitive to the structure, productivity, and configuration of the forest, they are good indicators of forest health and the ability of our forests to support healthy bird populations. The Cornell Laboratory's publication "A Land Managers Guide to Improving Habitat for Forest Thrushes, 2003" provides additional details on minimum area size and species habitat preferences (Rosenberg et al. 2003).

As mentioned previously, the eastern wood peewee is a high priority in PIF Area 44. It is considered a forest interior and forest edge species, and will nest in smaller forest fragments assuming some interior habitat exists. It occurs most frequently in forests with some degree of openness, whether that is a result of forest structure, natural disturbance, or human alteration. Intermediate-aged forests with a relatively sparse mid-story are preferred (The Nature Conservancy 2001). Forest habitat patch size does not appear to be an important factor in habitat selection (Watts 1999).

Other species of conservation concern that would benefit from our forest habitat management are the northern flicker, scarlet tanager, and raptors such as red-shouldered hawk, northern saw-whet and barred owl (see appendix A). We will manage our forest habitat areas in larger, more contiguous blocks than presently exists to better support a wider diversity of forest-dependent and other breeding and migratory birds. As stated in the objective, we would maintain at least two 100+ acre contiguous blocks, while striving for at least 25+ acre blocks in the remainder of the forested stands.

### Strategies

*Continue to:*

- 1) Reforest cropland sites with native tree species when no longer in use
- 2) Treat invasive plants that are impacting native forest regeneration; use mechanical, prescribed fire, chemical or biological treatments as warranted depending on the species to be treated. Adhere to regional requirements for planning and review by Regional Contaminants Coordinator
- 3) Conduct annual landbird survey following regional protocol
- 4) Document and maintain records of all DFS sightings and forward on to DFS Recovery Team.

- 5) In cooperation with the DFS recovery team, conduct periodic monitoring activities which may include use of observers and/or cameras

*Begin within 3 years of CCP approval:*

- 6) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

*Begin within 5 years of CCP approval:*

- 7) Work with partners, such as state and Federal forest management agencies, to conduct a bi-annual forest health assessment; evaluate the risk from pests and pathogens, wildfire, or other threats and determine whether management is warranted to protect the health and integrity of the forest stands. Identify strategies to promote and sustain a healthy, diverse, mature mixed forest with well-developed understory. Incorporate forest management practices into the HMP accordingly
- 8) Establish a minimum 330 foot forested buffer around the refuge's shoreline and tidal marshes to promote riparian habitat for forested birds, bald eagles and other raptors, and other wildlife and to provide other resource values, such as for water quality and marsh protection

### **Objective 1.3.2 (Grassland Habitat Management):**

Over the next 15 years, manage approximately 40.3 acres of grassland habitat with BayScape garden on the refuge, where at least 50% of those acres are in one contiguous habitat block, free of invasive species, to provide migratory stopover areas for grassland birds and butterflies.

#### **Basis of the objective:**

According to the Maryland Wildlife Diversity Conservation Plan (MD WDCP), the grasslands that occurred in Maryland prior to European settlement have all but vanished. However, approximately 240,000 acres of anthropogenic grasslands occur in the state, much of it as pasture, hayfields, and fallow fields. The vast majority (89%) of this acreage is on private land. Most of the state's remaining grassland fauna mostly persists in one or more of the following settings: (1) agricultural fields (e.g., hayfields, pastures, certain croplands, grass buffer plantings); (2) fallow fields; (3) recent clearcuts (within 1-3 years after logging); (4) reclaimed strip mines on the Allegheny Plateau; (5) mowed edges of airports and military airfields; and (6) remnant natural grassland communities. Some grassland species of conservation concern also occur in non-tidal and/or tidal marshes.

The limited availability and fragmented distribution of grassland habitat on the refuge reduces its suitability for breeding grassland birds and for other grassland-dependent taxa. Grassland habitat suitability for all taxa generally increases with the size and area-to-edge ratio at a grassland site. A number of grassland species (e.g., regal fritillary, grasshopper sparrow, Henslow's sparrow) are considered area-sensitive, occurring only in relatively large (>125-250 acre), un-fragmented grasslands, and/or exhibiting positive, area-dependent changes in population density or viability. Depending on the taxon, other important predictors of habitat suitability may include vegetative composition, height, structure and patchiness; surrounding landscape conditions; and topography.

Of the existing 30.7 acres of grassland on the refuge, approximately 22 acres occurs in one contiguous field near the old refuge headquarters (e.g. Cape Chester house). Within that field, a ¼ acre BayScape garden is maintained by volunteers. The remaining 9 acres of refuge grasslands are narrow, linear features lining refuge roads or moist soil management units. Of the additional 10.7 acres that we will create, these are also linear features primarily around

new moist soil units. Those narrower grassland strips may attract some grassland dependent species during migration, but we do not consider them quality breeding habitat for grassland birds.

Of the 20 bird species associated with grassland habitats in Maryland and listed as of greatest conservation need by MD DNR, 10 have been observed on the refuge. In chapter 2, table 2.11, we list those known on the refuge. One species, the field sparrow, is known to breed here, but most are uncommon or rare visitors.

Thirty-six butterfly species were documented on the refuge in five separate surveys conducted during 1998 and 1999, including four swallowtail species, three sulfurs, and nine species of skipper. The BayScape garden hosts a variety of plant species that attract butterflies, other insect pollinators, hummingbirds, other nectar feeders, and seed feeders. The refuge is an important stopover location for migrating monarch butterflies. Migrating monarchs often stop and rest at the southern tip of the refuge at Hail Point and other southern points along the Bay before crossing water. By November, they have usually reached their winter destinations, sometimes 2,000 miles away. The insects will spend the next five months overwintering in a dormant state, massed on the trees in the Gulf States and Mexico. One wintering site may attract millions of butterflies (Reshetiloff 2006)

The MD WDCP lists 19 recommended conservation measures to benefit grassland dependent species of greatest conservation need. The following are relevant to the refuge:

- Develop and implement protocols to control invasive species in a manner compatible with GCN species
- Restore and maintain native grassland communities
- Utilize appropriate prescribed burning in or light disking of selected portions of individual fields to maintain mid-successional seral stages and increase coverage of tall forbs
- Limit the use of pesticides such that GCN species and this habitat are not adversely affected
- Incorporate best management practices into land management plans
- Limit access and educate the public about the value of these habitats to minimize human disturbance
- Encourage the use of native seed stock for warm season grass plantings
- Convert agricultural fields on public lands to grassland habitat where feasible

### **Strategies**

*Continue to:*

- 1) Maintain grasslands through prescribed burning and mowing
- 2) Treat invasive plants using herbicides, mechanical, biological, and fire treatments as needed
- 3) Reseed using native grasses, where appropriate

- 4) Work closely with volunteers to maintain and enhance BayScape garden, to seek grants and other funding sources for its upkeep, and to conduct outreach and education for others interested in BayScaping
- 5) Monitor butterfly use using volunteers and other conservation partners

*Within 3 years of CCP approval:*

- 6) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

**Objective 1.3.3 (Bald Eagle Conservation):**

Over the next 15 years, manage mature forested habitats on the refuge to protect historic, current, and potential bald eagle nest sites and active nesting pairs of bald eagles. Also, identify and protect winter roost sites.



USFWS

*Bald eagle*

**Basis of the objective:**

Bald eagles, which were removed from the Federal Endangered and Threatened Species List in 2007, have successfully returned to breeding in most of Maryland's counties with 383 nesting pairs documented in 2004. An increasing number of bald eagles are over-wintering in Maryland as well (MD DNR 2005). The removal of the bald eagle from the Federal list was predicated on the assumption that they would continue to thrive in areas they presently occupy. As a result, we will continue to be concerned about their health, productivity, and any disturbance or threats during nesting season. As we noted in chapter 1, the bald eagle continues to be protected by the Bald and Golden Eagle protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA).

In the Bay region, eagle pairs build their nests from October through January, lay eggs from January to April, rear young from February through June and the young eagles fledge from May to August. During this entire period, eagle reproductive success may be adversely affected by human disturbance. If agitated by human activities, eagles may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests can jeopardize eggs or young. Depending on weather conditions, eggs may overheat or cool too much and fail to hatch. Unattended eggs and nestlings are subject to predation. Young nestlings are particularly vulnerable because they rely on their parents to provide warmth or shade, without which they may die as a result of hypothermia or heat stress. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Older nestlings no longer require constant attention from the adults, but they may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves. Once fledged, juveniles range up to ¼ mile from the nest site, often to a site with minimal human activity. During this period, until about six weeks after departure from the nest, the juveniles still depend on the adults to feed them (USFWS 2007f).

The Service developed the National Bald Eagle Management Guidelines (USFWS 2007f) to help minimize impacts to bald eagles, particularly where they may constitute disturbance. To avoid disturbing nesting bald eagles, we recommend (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or

replacement nest trees. On Eastern Neck Island, we are using 330 feet as a minimum forested buffer width along the shoreline.

We have some indication that a number of bald eagles may be roosting on the refuge in winter. We would like to verify this, and if so, manage to protect that roosting habitat and the eagles using it. We also plan to initiate discussions with the MD DNR to evaluate the need for expanded protection of nesting sites on the refuge that may be disturbed by boaters from the waterside. Activities on the water fall under the jurisdiction of the state.

### **Strategies**

*Continue to:*

- 1) Maintain a forested buffer zone of about 330 feet along the refuge shoreline to provide future nesting trees for bald eagles and to provide a buffer that minimizes disturbance from watercraft as recommended in the Service's Bald Eagle Management Guidelines (2007); plant trees where necessary to insure forested habitat will establish
- 2) Protect active nests and do not disclose their locations nor allow public use in the vicinity of nests
- 3) Participate in hacking programs to supplement or jump-start populations in other areas, in partnership with other state and Federal agencies
- 4) Continue annual active nest searches in later winter (February-March)

*Begin within 3 years of CCP approval:*

- 5) Survey for winter roosting eagles to determine if important areas are present
- 6) Cooperate with the state in developing a regulation that establishes a no disturbance zone along the shoreline to minimize impact to nesting bald eagles
- 7) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

**SUBGOAL 4:** Enhance management, protection, and monitoring of interjurisdictional fish and other aquatic species on the refuge and in surrounding waters.

### **Rationale for subgoal:**

The National and Northeast Regional Strategic Fisheries plans include a vision to “restore and maintain self-sustaining populations of native fish and other aquatic resources that maintain species diversity provide recreational opportunities for the American public, and meet the needs of tribal communities” (<http://www.fws.gov/northeast/fisheries/>).

The Bay's fish and other aquatic resources are among the richest and most diverse in the Nation. These resources, and the recreational, commercial, and intrinsic values they provide, have produced enormous ecological, social and economic benefits. However, despite efforts by the Service and others to conserve fish and aquatic resources, a growing number are declining at alarming rates. Dozens of aquatic species either have, or need, special protection in some part of their natural or historic range. Many of the anadromous fish species which spawn in the Bay, but spend most of their lives at sea, require extensive cooperative programs for restoration and management among numerous state and Federal agencies. These fish include the highly valued and historically important American shad, river herrings, Atlantic salmon, sturgeons, and striped bass.

The reasons for declines in aquatic populations are linked largely to habitat loss or alteration -including flow changes, dams and other watershed modifications, sedimentation and pollution - and the impacts of harmful exotic or transplanted species. Dozens of species of non-native fish and mollusks have been introduced to the Bay and tributary waters.

Biological and social scientists, government agencies, conservation groups, and the American public are becoming increasingly concerned about the decline of the Bay's fish and other aquatic resources and the economic impact of those declines. They point with increasing urgency to actions that must be taken to reverse these alarming trends. Management and conservation of virtually all fish and other aquatic resources are a shared responsibility. Success in reversing the trend will rely on continuing existing partnerships, and forging new partnerships, that cut across jurisdictions and link all affected stakeholders.

**Objective 1.4.1  
(Interjurisdictional Fish  
Conservation):**

Over the next 15 years, continue active participation in partners' efforts to protect and monitor interjurisdictional fisheries in the lower Chester River Basin and nearby portions of the Chesapeake Bay.

**Basis of the objective:**

Interjurisdictional fisheries are freshwater, coastal, or marine fish populations managed by two or more states, nations, or tribal governments because of their geographic distribution or migratory patterns (Conserving America's Fisheries, Fisheries Program Vision for the Future, September 2002, page 25). In addition, the Region 5 Fisheries Program includes the following guidance,

*"Interjurisdictional fisheries must be under the jurisdiction of and managed by two or more states, nations, or tribal governments. The general standard for inclusion in this category is the existence of an interagency management plan among two or more states, nations or tribal governments or other similar formal agreement that specifically identifies the native species or population of interest and identifies a role for the Fish and Wildlife Service; and the Fisheries Program has or intends to have a consistent commitment to species restoration as evidenced by approval by Region 5 Fisheries (or higher level within the Fish and Wildlife Service). Interjurisdictional species or populations, not covered by such a plan or agreement, will be considered on a case-by-case basis" (<http://www.fws.gov/northeast/fisheries/>).*

The Chester River provides spawning and nursery habitat for 9 anadromous fish species and 12 interjurisdictional species, 2 of which have State of Maryland endangered species status (USFWS 2006a).

*Shortnose sturgeon*



Duane Raver/USFWS

The update to the 2004-2008 Northeast Regional Fisheries Strategic Plan is in progress. The team has completed a list of aquatic species of conservation concern for the watershed that includes the refuge. Regional species of concern are defined as "...species in Region 5 for which Federal responsibilities for restoration, recovery or management have been identified, and for which the Fisheries Program has decided to direct its efforts." Species of concern for the refuge area include: alewife, American eel, American and hickory shad, blue-black herring, striped bass, shortnose and Atlantic sturgeon, and horseshoe and blue crab. Highlights of some of those species follows:

The Federal-listed endangered shortnose sturgeon is an anadromous species and ranges along the Atlantic coast. One of this species' 19 population segments in North America occurs in the Bay. Human impacts, such as bridge construction and demolition, can have adverse effects on swimbladder fish such as the shortnose sturgeon (Litwiler 2001). Other human impacts and biological factors that cause population decline in shortnose sturgeon and conservation actions to protect the species are presented in the MD WDCP (MD DNR 2005).

The Atlantic sturgeon is a candidate for Federal-listing. MD DNR Fisheries Service is working to restore viable, self sustaining populations of this species to the Bay using a combination of closed fishery, removal of barriers to spawning grounds, water quality improvements, and hatchery-produced fish. Information regarding threats and conservation actions for this fish can be found in the Fishery Management Plan for Atlantic Sturgeon by the Atlantic States Marine Fisheries Commission (ASMFC 1990).

The horseshoe crab is an interjurisdictional species known to spawn on the southern tip of the refuge. In June 2009, refuge staff began a tagging program to learn more about the local horseshoe crab population. Biologists from state and federal agencies across the range of this species participate in this cooperative tagging program. Tag return data provides information about horseshoe crab migration patterns, distribution, abundance, and mortality, which informs the management of horseshoe crab populations. Horseshoe crabs present a complex marine resource management issue on the Atlantic coast. They play a vital ecological role in the migration of shorebirds along the entire Atlantic seaboard, as well as providing bait for commercial American eel and conch fisheries along the coast. Additionally, their unique blood is used by the biomedical industry to produce *Limulus Amoebocyte Lysate* (LAL), an important tool in the detection of contaminants in patients, drugs and other medical supplies. The challenge of fisheries managers is to ensure that horseshoe crabs are managed to meet all these diverse needs, while conserving the resource for its self-perpetuation (ASMFC 2007).

The blue crab is an interjurisdictional species also found in the Chester River. During the winter months, the blue crab occurs in low densities and is distributed along the southern side of the refuge. In the summer, blue crab density is much higher and is distributed along the entire refuge. Spawning for this species occurs during the summer surrounding the refuge.

#### *Strategies*

##### *Continue to:*

- 1) Facilitate research by partners' to study interjurisdictional fish and other species, if projects are compatible and support refuge goals and objectives (e.g. horseshoe crab and blue crab spawning in area)

##### *Within 1 year of CCP approval:*

- 2) Initiate discussion with MD DNR about management strategies that will help protect SAV beds, other aquatic habitats, and water quality of the Chesapeake Bay and Chester River

#### **Objective 1.4.2 (Other Fish and Aquatic Species of Concern Protection):**

Over the next 15 years, continue to actively participate in partners' efforts to protect and monitor other aquatic species of regional and State concern, including the diamondback terrapin.

**Basis of the objective:**

The Bay supports an incredibly rich diversity of aquatic life, in addition to the fisheries identified in objective 1.4.1. At least seventy species of fish and numerous shellfish spend a portion of their life cycle in the mesohaline estuaries of the Bay near the refuge, using it for spawning, as juvenile nursery areas, or for foraging. Some species of concern are consistently observed in the waters surrounding the refuge, although generally their numbers are declining. The Atlantic menhaden and American oyster are examples. The menhaden is found in the Chester River; the upper part of the river serves as a nursery area, the area surrounding the refuge provide juvenile habitat, while the lower river serves as an adult concentration area. Menhaden are important prey to many predatory fish and birds, thus forming an important link in the Bay food web. The oyster occurs in the Chester River. It represented the Bay's most valuable commercial fishery until about the 1980s when over-harvesting, dwindling habitat, pollution, and diseases caused severe declines. It filters water for food, improving water clarity and quality conditions for SAV and other species (EPA 2002).

Other aquatic species of concern are only rarely seen, such as the Federal-listed endangered loggerhead and leatherback sea turtles and humpback whale. All have been seen at least once in the eastern Bay area, but not since 1992. While we remain watchful for their presence, they have not been a focus of management.

Diamondback terrapins, however, are of particular interest to us because they use refuge lands and until recently, were an active commercial fishery managed by the MDDNR. Effective July 1, 2007, it became unlawful to take or possess them for commercial purposes and recreational harvest was limited to 3 per person. (Chapters 117 & 118, Acts of 2007; Maryland Code of Natural Resources Article, sec. 4-902). While this legislation was a major step forward for terrapin conservation, we remain concerned about their future. Where feasible, and within our authority and jurisdiction to do so, we are placing emphasis on preserving or expanding well developed sandy beach heads that are the primary nesting areas for terrapins, reducing disturbance during the nesting season, controlling predators of eggs and hatchlings (primarily raccoon, fox and rat) and reducing mortality on roads. In addition, our actions under objectives 1.1.1, 1.1.2 and 1.1.3 to protect and restore shoreline, tidal marsh, and shallow water habitats would contribute to the conservation of terrapins. We will also insure that the terrapin conservation is considered in the design of future erosion abatement measures, especially regarding the effects on nesting beaches for terrapins. For example, proposals for bulkheading and riprapping would cause us concern.

In their wildlife diversity conservation plan, MD DNR proposed 21 different conservation actions to protect these fish and other aquatic species of concern, or restore their habitats. Among the actions most relevant on the refuge are:

- 1) Reestablish and conserve SAV beds in areas where they formerly occurred and where water quality has improved since their disappearance
- 2) Initiate measures to protect, maintain, and improve all species habitats and populations through coordinated efforts with various programs, especially the Chesapeake Bay Program
- 3) Implement BMPs to reduce non-point source impacts and erosion control measures and promote the protection and preservation/restoration of aquatic/riparian communities

- 4) Maintain buffer zones to block siltation, pesticide, and fertilizer runoff to wetlands and develop regional strategies to reduce and restrict the flow of pesticides and other toxic contaminants into aquatic systems
- 5) Coordinate conservation efforts between various interest groups and across states boundaries, including state agencies
- 6) Improve and promote education and public outreach efforts
- 7) Develop and implement protocols to control invasive species
- 8) Work with NGOs, including Chesapeake Bay Foundation and the Alliance for the Chesapeake Bay
- 9) Implement compatible shore-erosion techniques
- 10) Limit boating activity to protect SAV beds
- 11) Implement required management actions in approved fishery management plans

We are implementing each of the conservation actions noted above at some level on the refuge. Many of our implementation strategies are described under objectives for protecting and restoring shoreline, tidal marsh, and shallow water habitats. We would continue these actions at their current levels.

### **Strategies**

*Continue to:*

- 1) Implement efforts under subgoal 1 to protect shoreline, tidal marsh, and shallow water habitats as discussed under subgoal 1
- 2) Support partner-led research on diamondback terrapin
- 3) Establish a monitoring protocol to evaluate the status of sandy beaches which serve as turtle nesting areas, and the impacts from management
- 4) Evaluate all designs for future erosion abatement measures for their impact on nesting beaches for terrapin

*Begin within the next 3 years:*

- 5) Establish a GS-7 Biological Technician position to assist in implementing and monitoring the program (same position as listed under objective 1.1.1)

*Within the next 5 years:*

- 6) Evaluate the cause of predation on terrapin eggs; trap individual predators (e.g. foxes) as warranted

**SUBGOAL 5:** Consistent with the full extent of Service trust responsibilities, protect and restore archeological and historic resources on the refuge.

*Rationale for subgoal:*

As a Federal land management agency, we are responsible for locating and protecting cultural resources, specifically archeological sites and historic structures eligible for, or listed in, the National Register of Historic Places. Along with certain natural resources, these cultural resources are a Federal trust responsibility. This applies not only to refuge lands, but also on lands affected by refuge activities, and includes any museum properties. There are

**Objective 1.5.1  
(Archeological Resource  
Protection):**

numerous recorded archeological sites within the refuge area, and it is likely that additional prehistoric or historic sites may be located in the future. There is also the historic lodge, now used as the refuge headquarters and visitor facility, which is eligible for listing on the National Register.

Over the next 15 years, preserve archaeological resources on the refuge from destruction by coastal erosion or artifact looting.

**Basis of the objective:**

We describe our measures to curtail shoreline erosion under goal 1, subgoal 1, objective 1.1.1. Those actions will also help to reduce the loss of archeological resources caused by erosion.

Service initiated actions likely to affect archaeological and historic sites are routinely reviewed and assessed under the provisions of Sec. 106 of the National Historic Preservation Act. To date, projects requiring such review on the refuge have been confined to the architectural rehabilitation of the headquarters lodge structure, siting of facilities and moist soil management units, so refuge lands have never had a systematic archaeological survey in their entirety.

We suspect prehistoric archaeological sites on the refuge have been severely damaged by erosion, and some have probably vanished into the Chester River and Bay. Archaeologists in the State Historic Preservation Offices (SHPO), as well as in universities, museums, and consulting firms working in the Bay area agree that erosion is a significant threat to coastal archaeological sites in the state. Accelerated erosion is occurring all around the island. Shoreline protection efforts we plan under goal 1 will also serve cultural resource protection; however, these restoration plans often take years to implement and serve their purpose. If a concerted effort is not undertaken soon to locate, monitor, and assess archeological sites for listing in the National Register of Historic Places, and preserve or conduct archaeological excavation of them, a major piece of the region's prehistory and early history will be lost forever.

Looting of artifacts from shoreline eroding sites, and in newly cultivated fields on the refuge is well-documented but, fortunately, incidences have decreased in recent years. Regular law enforcement of these areas is critical to insure vandalism does not continue at the historically high rates. Unfortunately, law enforcement capabilities are limited on the refuge. Also, no staff members have attended the Federal Law Enforcement Training Center's Archaeological Resources Protection Act (ARPA) course. This hinders our ability to investigate looting violations. On the other hand, we strive to accomplish protection of cultural resources through partnerships in public education and monitoring with agencies and communities that have an interest in refuge lands and resources.

**Strategies**

*Continue to:*

- 1) Consult with the Maryland SHPO regarding Refuge undertakings that have potential to affect archaeological resources
- 2) Perform archaeological reviews, surveys, or studies of project areas as needed or recommended by the Service's Regional Archeologist
- 3) Raise awareness of the importance of protecting cultural resources through outreach and interpretive information and programs
- 4) Continue to maintain and store all museum property housed at the refuge

- 5) Ensure that museum properties housed at the refuge are stored to Federal preservation standards

*Begin within 5 years of CCP approval:*

- 6) Work with Maryland Archeological Society and other state, county and professional archeological societies willing to assist in performing surface surveys of selected refuge shoreline to locate archaeological resources at risk from coastal erosion or artifact looting. Develop site management and protection plans as warranted.
- 7) Establish a GS-9 Park Ranger/Law enforcement position to conduct outreach and enforce regulations to protect these resources; ensure that this position or another refuge complex law enforcement person receives ARPA training
- 8) Establish an agreement with Maryland DNR, other state agencies with law enforcement capabilities, and Kent County Sheriff's Department, all of whom have some jurisdiction on the Bay and shoreline, to assist in protecting cultural resources
- 9) Develop a prioritized program to perform additional surveys as funding allows; including a systematic program to monitor erosion and looting of known sites, as well as maintain historic structures on the Refuge. Also, conduct an Archeological Resources overview to identify areas with a high probability of containing archaeological sites. Consult with the Maryland Historic Preservation Office in developing priorities.
- 10) Facilitate research on the refuge that helps achieve cultural resource protection and conservation objectives
- 11) Include ARPA message in appropriate refuge brochures and information sites, including those produced by partners

**Objective 1.5.2 (Protection of Historical Structures):**

Within 5 years of CCP approval, establish an annual program of maintenance on all refuge structures which are eligible for the National Historic Preservation Register to ensure we meet the Department of the Interior's historic preservation standards.

*Basis of the objective:*

The National Historic Preservation Act considers deterioration of historic structures as an adverse effect upon them. The only known historic structure that is currently determined eligible for the National Historic Register is the headquarters lodge. This lodge was extensively renovated to Department of Interior historic preservation standards over the period 2000-2006, but some repairs are still needed. A field review by the Regional Facilities Coordinator documented a list of additional maintenance needs. Completing these repairs, and establishing a regular program of maintenance, will be essential to protect the structure from further deterioration. This structure is perceived by the public, preservation advocates, and historians as an important resource in Kent County, and its preservation is a Federal trust responsibility for the Service.

There is at least one other structure on the refuge, the former hunt club lands caretaker's house, that may have potential for the National Historic Register, but it has not been fully evaluated yet.

While most of the refuge's museum properties are housed at the Maryland Archeological Conservation Laboratory, there are several properties located at refuge headquarters that would be maintained to Federal preservation standards.

## Strategies

### *Continue to:*

- 1) Consult with the Maryland SHPO regarding refuge undertakings that have the potential to affect historic resources
- 2) Work with the Friends of Eastern Neck to seek alternative funding sources, develop political and public support for maintenance of the lodge and other cultural resources, and pursue additional partnerships to accomplish priority needs

### *Within 5 years of CCP approval:*

- 3) Complete all major maintenance identified in the 2007 field review/inventory of the lodge (Ortyl 2007), and develop an annual maintenance plan to insure the integrity of the building is sustained
- 4) Work with the Maryland Archeological Conservation Lab (MACL) to develop and conserve refuge exhibits and other artifacts located in the lodge
- 5) Establish a full-time GS-9 Park Ranger/Law enforcement position (same position as identified under objective 1.5.1) to conduct outreach and enforce regulations to protect these resources; ensure that this position or another refuge complex law enforcement person receives ARPA training

## GOAL 2

### **Maintain a healthy and diverse complex of natural community types comprised of native plants and animals to pass on to future generations of Americans**

#### **Rationale for goal:**

Eastern Neck Refuge supports a wide diversity of habitats, with brackish tidal marshes, natural ponds and impoundments, upland forests, hedgerows, and grasslands, and a variety of managed rotational croplands. In addition to the waterfowl and bald eagles mentioned in goal 1, these habitats support a broad array of breeding and migrating songbirds and other wildlife. It is a stopping over point for migrating monarch butterflies and also sustains many other species of breeding butterflies and other insects and invertebrates. Our challenge is to use our available resources as effectively as possible to deal with invasive plants and animals, optimize the mix of habitat types, and accommodate compatible wildlife-dependent public uses. Our goal is to manage these habitats to sustain a diversity of native species for the long term and to minimize invasive species.

**SUBGOAL 1:** Protect, enhance, and restore the natural diversity, integrity and health of community types and associated native plants and animals, and sensitive species on the refuge.

#### **Rationale for subgoal:**

The 1997 Refuge Improvement Act establishes that wildlife conservation is the singular Refuge System mission. Biological integrity, diversity and environmental health are critical components of wildlife conservation. Refuge System policy (601 FW 3) provides guidance for maintaining, and restoring where appropriate, those values on refuges. According to this policy, “the highest measure of biological integrity, diversity, and environmental health is viewed as those intact and self-sustaining habitats and wildlife populations that existed during historic conditions.” “Historic conditions” is meant to be a frame of reference, which will vary across the country, but is meant to suggest a time period prior to when the landscape went through major land use change and settlement. The policy makes a point that “No landscape retains absolute biological integrity, diversity, and environmental health.”

Biological integrity can be evaluated by examining the extent to which biological composition, structure, and function has been altered from historic conditions. The emphasis on biological diversity is on maintaining and/or restoring native species and natural communities such as those found under historic conditions. We are striving to maximize the size of habitat blocks to maintain connectivity between habitat blocks, unless there is an overriding reason not to do so. We evaluate environmental health by examining the extent to which environmental composition, structure, and function have been altered from historic conditions.

The policy instructs refuge managers to consider their refuge's contribution to biological integrity, diversity and environmental health at multiple scales. However, at a minimum, the priority is to maintain existing levels of those values at the refuge scale. Secondly, a refuge manager is guided to restore lost or severely degraded elements of integrity, diversity, health at the refuge scale, and other appropriate scales where it is feasible and supports achievement of refuge purposes and the Refuge System mission. One of the most important actions for us to undertake related to this objective is an inventory of resources and their condition.

**Objective 2.1.1 (Maintain Ecological Integrity):**

Within 5 years of CCP approval, insure the ecological integrity of refuge lands is maintained as measured through an effective inventory, monitoring, and assessment program.

**Basis of the objective:**

Service policy on maintaining biological integrity, diversity and environmental health on refuges (601 FW 3) specifies that refuge managers are tasked with assessing the current status of diversity, integrity and health on their refuges through baseline vegetation and population surveys and studies, and comparing those current conditions to historic conditions. The goal of the policy is to prevent additional degradation of environmental conditions and restore lost or severely degraded environmental components. We have some surveys and studies in place that will help with that evaluation, and many have been done in the past, but we have not determined in a comprehensive way what additional information is needed to formulate our baseline of current conditions and assess future conditions. Establishing what additional data is needed, prioritizing that list, and implementing a program to insure that we can evaluate current and future ecological integrity on the refuge is the fundamental purpose of this objective.

**Strategies**

*Continue to:*

- 1) Support partners' efforts to assess the current status of diversity, integrity, and health on the refuge, e.g. the beach beetle study with the Smithsonian Institute
- 2) Maintain a GIS database for storing data such as vegetation and habitat types, unique habitat components, and wildlife information; update on at least an annual basis, or as frequently as new information warrants

*Begin within 5 years of CCP approval:*

- 3) Prioritize a list of baseline inventory and monitoring needs that would help assess ecological integrity, many of which are identified under other objectives; focus on such things as invasive pests and plants, amount and distribution of native vegetation, SAV beds and tidal marsh, water quality, and shoreline integrity. Also, determining which ecological processes had the greatest influences historically and whether they should be restored at some level may also be considered. Wildlife impacts and responses to any manipulations should be included as well.

- 4) Develop protocols for collecting the information if there are not regional protocols already established. Also, consider a combination of individual metrics from those protocols that could also be combined to best determine an overall ecological integrity value for the refuge. This value could be measured over time to help assess whether management is maintaining, reducing or improving ecological integrity.
- 5) Pursue opportunities to have partners or volunteers complete or assist in inventories and monitoring

### Objective 2.1.2 (Research Partnerships):

Over the next 15 years, foster relationships with researchers who will study critical refuge research needs, including those related to assessing diversity, integrity, and health.

#### Basis of the objective:

Fortunately for us, the refuge is sought after as a place to conduct research on undeveloped and restored Bay environments. During public scoping, we heard from several individuals who have conducted research and indicated the refuge serves as a great living biological laboratory.

We have obtained valuable refuge information through these research partnerships. This has particularly benefited us as we have not had the staff or funding to accomplish this work on our own. Some of those partnerships include Smithsonian Institute, who studied shore-inhabiting tiger beetles and other *Coleoptera*. We would continue these partnerships and encourage new ones to enhance our ability to achieve our goals and objectives, and to monitor the effectiveness of our actions. Our objectives under goals 1 and 2 identify many specific inventory and research projects that we hope to pursue in the near future.

#### Strategies

*Continue to:*

- 1) Support partner's research on biodiversity (e.g. Smithsonian Institute's research on restored sand beaches and beetle activity)
- 2) Encourage volunteers and partners to conduct inventories and research that help achieve refuge goals and objectives

*Begin within 5 years of CCP approval:*

- 3) In cooperation with state agency and conservation partners, identify the highest priority research and inventory needs for the refuge
- 4) Work with researchers to identify research goals, study design and methodology and opportunities for alternative sources of funding

### Objective 2.1.3 (Invasive Plant Control):

Over the next 15 years, control invasive plants on the refuge, treating at least 50 acres a year, to ensure that less than 25% of refuge lands are dominated (75% cover) by an invasive species.

#### Basis of the objective:

Controlling invasive, exotic species is a major consideration in managing for native diversity, integrity and health in the Refuge System. According to policy, refuge managers are to prevent the introduction of those species, detect and control them if encountered, and provide for the restoration of native species and habitats in invaded areas. Integrated pest management strategies that incorporate the most effective combination of mechanical, chemical, biological and cultural controls are recognized as important tools (refer to 601 FW 3).



Jonathan Friday/USFWS

*Refuge volunteer mapping invasive species*

Common reed or *Phragmites* is a familiar sight in most wetland areas along the East Coast. Its ability to tolerate a range of conditions associated with polluted areas has allowed it rapidly to colonize new areas over the last few decades. *Phragmites* spreads by seed dispersion; it produces seeds in great abundance. It also spreads through the reproduction of its root system. The roots grow laterally, creating dense, thick mats. *Phragmites* stands are a problem because they dominate wetlands, reducing wetland diversity, provide little to no shelter for resident wildlife, and the dense roots can alter the hydrology of wetlands by trapping sediments, causing a drying effect. (CBP 2008)

*Phragmites* can be controlled using a variety of chemical and harvesting methods. Chemical treatments include spraying and using wipe-on herbicide (wicking), but these methods cannot guarantee complete eradication. Other methods of controlling *Phragmites* include dredging, seasonal mowing, the use of plastic barriers and burning. Controlled burning is a quick and efficient method that reduces biomass and increases soil nutrients. Often a combination of methods will yield the best results. (CBP 2008).

Our highest priorities on the refuge for invasive plant control or eradication would continue to be *Phragmites*, mile-a-minute, Johnsongrass, and Canada thistle. However, we have numerous other species that are pervasive across the refuge and that we will target for control because of our concern with decreasing biodiversity and competition with native vegetation. Because there are so many species to address, invasive plant control has become a major problem and will require a massive effort to control on this refuge. Our most recent Integrated Pest Management Plan (2007) identifies our management strategies to be implemented in the near term.

We will continue and expand on our aggressive campaign to control or eliminate invasive plants

### Strategies

*Continue to:*

- 1) Employ the following methods to control invasive plants in accordance with our 2007 integrated pest management plan:
  - Herbicides
  - Biological control agents
  - Mechanical-mowing
  - Prescribed fire
- 2) Monitor management activities through photo points, vegetation plots and general observations.

*Begin within 3 years of CCP approval*

- 3) Develop a prioritized list of treatment areas, elevating those with the highest wildlife resource values in locations with high public use. The GS-7 Biological Technician position identified in objective 1.1.1 and elsewhere would be key to implementing any increase in mechanical treatments for invasive species
- 4) Ensure acres treated, their location, and other relevant data is included in GIS database and updated each year

### **SUBGOAL 2: Protect the integrity of Federal-designated Research and Public Use Natural Areas**

#### **Rationale for subgoal:**

The Service administratively designates research natural areas (RNAs) and Public Use Natural Areas (PUNAs) on refuges. Currently there are 210 RNAs

across the Refuge System, including 1,955,762 acres. RNAs are part of a national network of reserved areas under various Federal land ownerships. Other Federal land management agencies also have designated RNAs. They are intended to represent the full array of North American ecosystems with their biological communities, habitats, natural phenomena, and geological and hydrological formations.

In RNAs, as in designated wilderness, natural processes are allowed to predominate without human intervention. Under certain circumstances, deliberate manipulation may be used to maintain the unique features for which the research natural area was established. Research and educational opportunities for scientists and others should be encouraged in RNAs to contribute to our understanding of the environment.

Activities such as hiking, bird watching, hunting, fishing, wildlife observation, and photography are permissible, but not mandated, in research natural areas. RNAs may be closed to all public use if such use is determined to be incompatible with primary refuge purposes (<http://www.fws.gov/refuges/habitats/specialAreas.html>).

PUNAs are a separate designation used only by the Service and the Refuge System. The network of PUNAs across the country were established to ensure the preservation of a variety of significant natural areas for public use with certain restrictions and which, when considered together, illustrate the diversity of the Refuge System natural environments, and preserve these environments as essentially unmodified by human activity for future use. The capability of the area to possess "...exceptional value or quality in illustrating or interpreting an element of the natural heritage of our Nation" is an important consideration (Refuge Manual 8 RM 11.1). This criterion is also an important distinction between RNAs and PUNAs.

Scientific research is also encouraged in PUNAs, as is non-research educational use. Recreational activities should be limited to only those that are compatible with the maintenance of resource integrity and significance.

**Objective 2.2.1 (Hail Point Research Natural Area):**

Over the next 15 years, protect and restore the Hail Point Marsh and Peninsula Research Natural Area to insure it continues to meet the criteria and ecological values for which it was established.

**Basis of the objective:**

In 1975, the Service designated the 149-acre tidal salt marsh at Hail Point as a RNA because it was considered a relatively undisturbed, naturally-functioning intact tidal marsh and because it contained an unusual plant association, a 20-acre loblolly pine-American holly forest. In addition, at the time it was designated, there was a 50 nest great blue heron colony and an osprey nest site.

This RNA is located in the most isolated portion of the refuge and thereby minimally affected by human factors, except for occasional boaters traveling around the southern end of the refuge. This area is also known as a monarch butterfly staging area where the butterflies can be observed resting in their fall migration before attempting their flight across the Chesapeake Bay.

This area of the refuge is experiencing significant erosion from the Chester River-side. In addition to installing breakwaters to protect the RNA as described under goal 1, objective 1.1.1, we will continue to prohibit public access to the shoreline to ensure that no other activities threaten the site's integrity.

### Strategies

#### *Continue to:*

- 1) Routinely monitor public uses in nearby parts of the refuge and note any signs of unauthorized access or uses from the land or water side

#### *Begin within 5 years of CCP approval:*

- 2) Determine what ecological criteria should be monitored and set up a program
- 3) Maintain monitoring results in GIS database

### **Objective 2.2.2 (Tubby Cove-Calfpasture Cove Public Use Natural Area):**

Over the next 15 years, manage the Public Use Natural Area in the Tubby Cove-Calfpasture Cove area to ensure it continues to meet the criteria and ecological, educational and interpretive values for which it was established.

### **Basis of the objective:**

In 1975, the Service established the Tubby Cove-Calfpasture Cove area as a Public Use Natural Area because it provided a relatively undisturbed natural setting that was accessible to the public, and affords exceptional educational and interpretive opportunities. The established trail allows people to view wildlife and marsh habitat, while minimizing impacts to resources by requiring people to stay on the trail and in the viewing area/platform.

### Strategies

#### *Continue to:*

- 1) Routinely monitor public uses in the PUNA and note any signs of unauthorized off-trail use or access from the land or water

#### *Begin within 5 years of CCP approval:*

- 2) Determine what establishment criteria should be monitored and set up a program
- 3) Maintain monitoring results in GIS database

## **GOAL 3**

**Conduct effective outreach activities and develop and implement quality, wildlife-dependent public use programs, with an emphasis on wildlife observation and photography, to raise public awareness of the refuge and the Refuge System, and promote enjoyment and stewardship of natural resources in the Chesapeake Bay region.**

### **Rationale for goal:**

Our desire is to be a recognized, welcomed, and valued part of the Eastern Shore community. Our concern is that we are not well known in the Kent County area. Raising the visibility of the Service, the NWRS, and the refuge will encourage people to learn about the importance of refuge habitats and species of concern, and the refuge's role in conserving Bay resources. An effective outreach program will enhance support for our programs and allow us to proactively anticipate and deal with public issues if they arise.

Hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation are the six priority wildlife-dependent public uses identified in the Refuge Improvement Act. The Act stipulates those six uses are to receive enhanced consideration in refuge planning, but does not establish a hierarchy among those six uses. Opportunities to engage in them should be provided to the extent compatible with specific refuge goals and objectives. The ability to fund the management of these activities is also a factor for refuge managers to consider in determining their compatibility. Service policy requires that refuge managers set limits on, and establish stipulations for, any of those

activities as warranted to ensure their compatibility. Each of these activities is already facilitated on current refuge lands.

An analysis in 2006 conducted by the Northeast Region's Visitor Services' team recommended that we focus on wildlife observation and wildlife photography opportunities on this refuge. Our goal is to improve current opportunities for those programs as a priority, and enhance other compatible programs to the extent feasible, through expanded programs, new infrastructure or improved access.

**SUBGOAL 1:** Enhance and increase effective public outreach activities to increase the visibility of the Service, the refuge, and the Refuge System and to garner increased appreciation and support for our conservation activities.

**Rationale for subgoal:**

A well-rounded and active program of public outreach raises the visibility of the Service and the Refuge System, and enables large segments of the public to learn about the importance of refuge habitats, species of conservation concern, cultural resources, refuge management, and the refuge's role in conserving the Chesapeake Bay ecosystem. An effective public outreach program will help us gain support for our programs and allow us to proactively deal with controversial refuge management activities. This program can be used to anticipate and avoid potential conflicts between the needs of wildlife and other refuge uses.

**Objective 3.1.1 (Community Outreach):**

Within three years of CCP approval, more than 50 percent of the adults contacted within Kent County will understand the importance of conserving habitat on Eastern Neck Island, will know that the refuge is part of a national system of wildlife refuges, be aware of the wildlife-dependent recreational opportunities available on the refuge, and plan to visit the refuge or actively participate in refuge programs or volunteer projects within the next year.

**Basis for the objective:**

In order to build a stronger base of public understanding, support, and activism beyond that portion of the American public who visit refuges, the Service has actively supported nationwide strategies, partnerships, legislation, and departmental mandates with a strong emphasis on outreach. These include the 100-On-100 Outreach Campaign, the National Outreach Strategy: A Master Plan for Communicating in the U.S. Fish and Wildlife Service, the Cooperative Alliance for Refuge Enhancement (CARE), the Volunteer and Community Partnership Act, and the Challenge Cost-Share Program.

We are particularly interested in outreach to the local communities in Kent County. Our desire is to be a welcomed and valued asset to those communities. A positive community relationship is a crucial link between public support for refuges and effective management of the Refuge System. We are aware that there are many residents who either do not know that a National Wildlife Refuge is nearby, or do not recognize its regional importance to the Chesapeake Bay ecosystem.

We are striving for a well-rounded program of public outreach to enable large and diverse segments of the public to learn about the importance of refuge wetland and upland habitats, species of conservation concern, cultural resources, refuge management, and the refuge's role in the Refuge System. An effective public outreach program can also help win friends and proactively deal with controversial refuge management activities. This program can be used to anticipate and avoid potential conflicts between the needs of wildlife and other refuge uses.

We believe that regular communications within the community is very important. News articles and personal appearances inform our neighbors about what we are doing and why, which will hopefully lead to increased understanding, appreciation, and support of our programs. Feedback we receive from these outreach efforts allows us to better understand issues that are important in our communities, and how our management may affect them.

We also believe that actively engaging people in meaningful refuge programs or projects will make a more lasting impression. We offer many opportunities for people to get involved. Partners, volunteers and members of the Friends of Eastern Neck are vital to accomplishing our outreach activities. They assist us in community events and refuge visitor programs as well as support data gathering, maintenance projects, and staffing a visitor contact station. This assistance support us in meeting the refuge's goals and objectives, supports the missions of the Refuge System and the Service, and fosters good community relationships.

### **Strategies**

*Continue to:*

- 1) Issue news releases to local and regional print and electronic media when newsworthy events occur; to announce scheduled activities, and to keep the public informed about refuge management activities
- 2) Routinely respond to written, telephone, and in-person inquiries from the public
- 3) Use staff and volunteers to participate in display exhibits at special events on Maryland's Eastern Shore
- 4) Distribute to the public our current leaflets, consisting of a general brochure, bird list, interpretive leaflet for hiking trails and recreation areas and deer hunt information and map
- 5) Maintain and regularly update contact information for partners, elected officials, the media, and the public
- 6) Work towards more informed and productive relationships with the local media; establish personal contacts at all media outlets
- 7) Inform refuge neighbors of refuge management activities via the website, press stories, and letters
- 8) Promote our successes in the local community via refuge and community events, project demonstrations, and press stories
- 9) Use Friends of Eastern Neck members to assist in staffing the Refuge Visitor Contact Station while providing coverage at the Friends of Eastern Neck Book Store seven days a week These hours would continue to provide visitors an opportunity to have questions answered, obtain various brochures, view various exhibits and make purchases
- 10) Partner with the Kent County Bird Club to use the refuge as a site for their various birding programs
- 11) Encourage use of the conference room/auditorium to conservation and/or educational organizations to conduct meetings and workshops
- 12) Support the Friends Group's participation in local community events, such as the Chestertown Tea Party, Chestertown Wildlife Exposition and Rock Hall Fall Festival

- 13) Utilize volunteers to participate in other community events in Kent County where effective outreach of refuge programs can occur; work with Kent County Tourism, Rock Hall Visitor Center, and other community organizations in conservation-related events and activities as they are being developed
- 14) Develop and implement annual volunteer recruitment, training, and appreciation/recognition events

*Begin within 5 years of CCP approval:*

- 15) Upgrade the visitor services specialist position to a GS-9 to reflect the increased complexity associated with developing and coordinating program plans and partnerships. This position will also allow us to accomplish all of the visitor services objectives and strategies, and to:
  - a) Determine the most efficient ways to conduct outreach
  - b) Develop a Visitor Services Plan to strategically create, enhance, implement, and evaluate our visitor services opportunities
  - c) Develop and implement procedures to offer refuge “behind the scenes” tours to the media, elected officials, and the general public
  - d) Develop and implement a video/DVD about the CM Refuge Complex
  - e) Initiate outreach to local kayak and canoe rental facilities to promote the new water trail and limit trespass and related problems at the refuges
- 16) Create and maintain refuge-specific fact sheets
- 17) Expand refuge outreach programs to include recognized events such as, but not limited to, International Migratory Bird Day, National Wildlife Refuge Week, Earth Day, and National Boating and Fishing Week designed to promote wildlife-dependent recreation and natural resource education. The program should capitalize on the refuge’s proximity to the Baltimore, Philadelphia and Eastern Shore towns.

**Objective 3.1.2 (Other Agencies and Partner Outreach):**

Over the next 15 years, continue to foster and enhance cooperation and communication with other state and Federal agencies, museums, civic organizations, environmental and conservation groups to promote and advance the Refuge System mission and refuge goals.

**Basis for the objective:**

Besides the Friends of Eastern Neck and our volunteers, we have many other partners who help us conduct outreach within professional, academic, non-governmental organizations, and government agency arenas. This is generally achieved through means such as professional or agency meetings and presentations, publications, and refuge tours. We identify many of these partners in goals 1 and 2.

These partners include several government and local agencies active in the refuge area who share in the responsibility to conserve natural resources. Among them are the U.S. Army Corps of Engineers, U.S. EPA, USDA - NRCS, MD DNR, planning district commissions, historical preservation commissions, soil and water conservation district commissions, chambers of commerce, Kent County government, and others. We plan to continue to work closely with these entities to achieve mutual outreach objectives.

We also plan to continue our collaborations with educational and research institutions to facilitate their research and investigations that help us seek answers to important natural resource issues on the refuge and within the refuge system and to contribute our basic understanding of important natural resource issues worldwide. The Smithsonian Institute, National Aquarium in Baltimore,

and several area universities are examples of our current educational and research partners.

Encouraging relationships with non-governmental conservation organizations active in the Chesapeake Bay region will also be important in our overall outreach strategies. The Chesapeake Bay Foundation, Gateways Network members, Alliance for the Chesapeake Bay, Ducks Unlimited, and the Easton Waterfowl Festival are examples.

### **Strategies**

*Continue to:*

- 1) Maintain regular contact with private, state, local, and other Federal agencies, environmental groups, congressional offices, and other interested parties

*Begin within 5 years of CCP approval:*

- 2) Upgrade the visitor services specialist position to a GS-9 to reflect the increased complexity associated with developing and coordinating program plans and partnerships. This position will also allow us to accomplish all of the visitor services objectives and strategies, and to:
  - a) Review existing partner relationships to determine if outreach, or the dissemination of information, could be more effective; facilitate the publication of refuge research results written for non-scientific audiences to the extent possible
  - b) Evaluate all existing or planned partnerships to identify those that will benefit from formal MOUs/MOAs or cooperative agreements. This will help identify mutual goals, cost sharing, technical exchange, and environmental education and interpretation opportunities
  - c) Work with partners to highlight work and successes; use media links (e.g., websites)

**SUBGOAL 2:** Ensure that visitors are satisfied with the safety, accessibility, and quality of opportunities to observe and photograph wildlife on the refuge.

### **Rationale for subgoal:**

While our primary mission is to protect wildlife and promote wildlife conservation, the 1997 Refuge Improvement Act directs us to provide six priority wildlife-dependent recreational uses in the Refuge System: hunting, fishing, wildlife observation and photography, and environmental education and interpretation where it is compatible. By providing the public with safe, accessible quality opportunities and well-maintained facilities for those uses, we hope to raise public awareness, understanding, appreciation and stewardship of the Chesapeake Bay ecosystem and the benefits of its conservation for fish, wildlife, and people. Ultimately, these will contribute to the mission of the refuge and the Refuge System.

Region 5 National Wildlife Refuge visitor service's specialists and management staff conducted an assessment in 2006 and established which two priority public use programs should be emphasized on individual refuges. Wildlife observation and photography were selected for this refuge. The determination was based on careful consideration of our natural resources, existing staff, operational funds, existing and potential facilities, and which programs we would be most effective in providing "quality" opportunities for visitors. While all priority public uses are important and offered to some degree on the refuge, wildlife observation and photography programs will receive greater emphasis when prioritizing refuge complex resources. In chapter 3 we describe in detail the facilities and programs we offer to support wildlife observation and photography. As always, we look to our partners, Friends Group, and volunteers to assist with our public

use programs. We will provide these opportunities in ways that do not adversely impact wildlife resources.

**Objective 3.2.1 (Wildlife Observation and Photography):**

Within 5 years of CCP approval, at least 90 percent of all upgrades of existing trails, observation platforms and blinds, would be completed to provide visitors with quality opportunities for wildlife observation and photography.

**Basis of the Objective:**

Wildlife observation and hiking constitute the majority of use on the refuge throughout the year. Over 55,000 people visit the refuge each year, and based on our informal monitoring, most come to the refuge to view and photograph wildlife. Maintaining quality infrastructure, and providing some new facilities, would enhance visitor opportunities to view the relationships among resource management, wildlife, habitat and people. Our facilities for public visitation include parking, restrooms, information kiosks, nature trails, photo blinds, boardwalks and interpretive literature/signs. Most of our facilities are open year round. The only exception is Ingleside Recreation Area and its access road, which would remain closed to visitors from October 1 to March 31 to protect wintering waterfowl.

We recognize a few shortcomings with our current program. A few trails are in need of upgrading. There is no parking for hikers at the Boxes Point Trail. This causes conflict with vehicles and pedestrians in that area. Benches are present on some trails which provide a resting spot for hikers; however, providing benches on all trails would enable hikers to sit quietly and enjoy the beauty around them. Trespassing and littering on the refuge has been increasing in recent years. These activities adversely affect wildlife and their habitat and can pose a threat to public safety. Our limited outreach and enforcement capabilities exacerbate this problem.

We will also strive to meet these guiding principles for refuge wildlife observation and photography programs identified in Service policy (605 FW 4 & 5):

- Provide safe, enjoyable, and accessible wildlife viewing and photography opportunities and facilities;
- Promote visitor understanding of, and increase visitor appreciation for, America's natural resources;
- Provide opportunities for quality recreational and educational experiences consistent with criteria describing quality found in 605 FW 1.6; and,
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreation activities.

We would continue to work with partners, and seek new ones, that facilitate quality wildlife observation and photography opportunities. For example, the public birding programs that have been offered by the Kent County Bird Club have met with great success and large attendance.

**Strategies**

*Continue to:*

- 1) Maintain the following wildlife observation facilities:
  - a) Visitor Contact Station at Refuge Headquarters with access to Tidal Marsh Trail and observation blind
  - b) Tundra Swan Boardwalk with two viewing scopes
  - c) Bayview Butterfly observation platform with two viewing scopes
  - d) Bayview Trail with observation blind

- e) Wildlife Trail with observation blind
  - f) Duck Inn Trail
  - g) Boxes Point Trail
  - h) Ingleside Recreation Area
  - i) Bogles Wharf
  - j) Tubby Cove boardwalk with observation blind and platform
  - k) Wickes historic site and marker
- 2) Allow guided bird walks performed by the Kent County Bird Club providing observation opportunities and techniques for visitors
  - 3) Allow volunteers to install and maintain osprey platforms, wood duck nesting boxes, and tree swallow and bluebird houses in areas where the public may observe wildlife activity. Only implement if there is a long-term commitment by volunteers to manage program.
  - 4) Encourage wildlife observation by canoe and kayak around the perimeter of the island except in areas seasonally closed to protect sensitive wildlife. Water trail maps would continue to be available for purchase at the Friends of Eastern Neck book store.
  - 5) Provide for sale, through The Friends of Eastern Neck, a water trail guide

*Begin within 1 year of CCP approval:*

- 6) Formalize partnerships with environmental organizations, including Kent County Bird Club, who provide birding programs at the refuge
- 7) Initiate discussion with MD DNR about management strategies to minimize activities that disturb resting and feeding waterfowl, bald eagles, or impact marsh vegetation
- 8) Work closely with canoe and kayaking groups to reduce winter disturbance
- 9) Initiate the following:
  - a) Improve the Bayview Butterfly Trail.
  - b) Improve the spur trail off the Wildlife Trail that leads to an observation blind.
  - c) Evaluate need and opportunity for parking area at Boxes Point Trailhead

*Begin within 5 years of CCP approval:*

- 10) Upgrade the visitor services specialist position to a GS-9 (same position as identified under objective 3.1.1) to reflect the increased complexity associated with developing and coordinating program plans and partnerships. This position will also allow us to accomplish all of the visitor services objectives and strategies, and to:
  - a) Develop a Visitor Services Plan for the refuge and
  - b) More strategically plan, implement and monitor our wildlife observation and photography programs
  - c) Hire and supervise Visitor Services' interns to help accomplish program objectives
- 11) Establish a GS-9 Park Ranger/Law enforcement position (same position as identified under objective 1.5.1) to conduct outreach and enforce regulations that allow for a quality program

**SUBGOAL 3:** Provide opportunities for quality, recreational fishing and hunting.

**Rationale for subgoal:**

Hunting and fishing are two of the six priority wildlife-dependent public uses for the National Wildlife Refuge System. We provide opportunities for both activities on the refuge. We believe we are offering quality programs that meet public demand and our wildlife and habitat goals, and do not detract from our visitor service's management program emphases on wildlife observation and photography.

**Objective 3.3.1  
(Recreational Fishing and  
Crabbing):**

Over the next 15 years, provide quality recreational fishing and crabbing access at the Entrance Bridge, Tundra Swan Boardwalk, Boxes Point Trail, Duck Inn Trail, Bogles Wharf, and Ingleside Recreation Area, and annually, provide a quality youth fishing event for approximately 75 youth anglers at the Headquarters Pond.

**Basis of the objective:**

The Service does not have jurisdiction over the shallow and deep waters surrounding the island and therefore we do not regulate fishing or other water-based activities within the navigable waters of the State, or within areas where water bottoms are State-owned. However, we do provide access to these activities from refuge lands, and conduct enforcement of rules and regulations at the areas.

Fishing and crabbing have been historical, consumptive recreational uses on the refuge that we believe are compatible with our resource objectives. Approximately 1,500 anglers use the refuge to access fishing areas each year; however, this number tends to fluctuate with the quality and availability of crabbing.

We will strive to meet these guiding principles for a refuge recreational fishing program identified in Service policy (605 FW3 and 4):

- Effectively maintain healthy and diverse fish communities and aquatic ecosystems through the use of scientific management techniques;
- Promote visitor understanding of and increase visitor appreciation for America's natural resources;
- Provide opportunities for quality recreational and educational experiences consistent with criteria describing quality as defined in 605 FW 1.6;
- Encourage participation in this tradition deeply rooted in America's natural heritage and conservation history; and,
- Minimize conflicts with visitors participating in other compatible wildlife-dependent activities.

**Strategies**

*Continue to:*

- 1) Permit access for fishing and crabbing from the Entrance Bridge, Tundra Swan Boardwalk, Boxes Point Trail, Duck Inn Trail, Ingleside Recreation Area, and Bogle's Wharf. Ingleside Recreation Area would continue to be open only from April 1 through September 30. No refuge permit is required.
- 2) Prohibit fishing in refuge ponds, pools, impoundments, and wetlands to prevent disturbance to wildlife and habitat. The only exception is the annual, one-day Youth Fishing Derby at the Headquarters' Pond.

*Begin within 5 years of CCP approval:*

- 3) Establish designated shoreline and boat fishing access locations in areas where resource damage is a concern
- 4) Some sites may be closed periodically to reduce resource damage, or minimize conflicts with other habitat management activities. Notification of closures would be posted on the refuge website, announced in the local paper, on signs located at the refuge entrance, and parking areas at least 48 hours prior to its closure.
- 5) Provide visitors with general information on the fishing program and refuge specific rules and regulations through the refuge website, informational signs at parking areas, trailheads, the refuge entrance road, and at refuge headquarters
- 6) Provide monofilament line-disposal units at all fishing access areas
- 7) Establish a GS-9 Park Ranger/Law enforcement position (same position as identified under objective 1.5.1) to conduct outreach and enforce regulations that allow for a quality program

**Objective 3.3.2 (Deer Hunting):**

Within 3 years of CCP approval, more than 80% of the hunters who are contacted claim to have had a quality white-tailed deer hunt experience on the refuge.

**Basis of the objective:**

Hunting on the Eastern Shore is a traditional outdoor past time, and is deeply rooted in our American heritage. A quality hunt program helps develop an appreciation for fish and wildlife. It is also a tool to assist in deer population control and habitat management efforts on the refuge.

Opportunities for public hunting are decreasing with increasing private land development. Refuge lands thus become increasingly important in the region as a place to engage in this activity.

We will strive to meet the following guiding principles for a refuge hunting program identified in new Service policy (605 FW 2):

- Manage wildlife populations consistent with Refuge System-specific management plans approved after 1997 and, to the extent practicable, State fish and wildlife conservation plans;
- Promote visitor understanding of and increase visitor appreciation for America's natural resources;
- Provide opportunities for quality recreational and educational experiences;
- Encourage participation in this tradition; and,
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreational activities.

The refuge hunt program is implemented consistent with state regulations and additional refuge regulations stipulated in 50 CFR. Our deer hunt area map is depicted in chapter 3, map 3.7. Included in our hunt plan objectives is the intent to maintain the deer population at a level commensurate with available habitat, in order to maintain the health of the herd and prevent habitat degradation that accompanies overpopulation. Our current program is a seven-day hunt. In general, we believe the extent of our current program meets the needs of our public and provides a quality experience. However, we will continue to evaluate

the program on an annual basis and modify it, as warranted, given new biological or visitor data.

### Strategies

*Continue to:*

- 1) Permit white-tailed deer hunting for: two days of muzzleloading rifle; two days of shotgun; one day of archery hunting; one day of non-ambulatory hunting; and, one day of youth hunting
- 2) Provide this opportunity to a maximum of 650 hunters each year (100 adult hunters per adult hunt day, and approximately 50 youth hunters). A fee would continue to be required to apply for a permit. Senior citizens receive a 50 percent discount on these fees if the applicant possesses a Senior Pass which is part of the Federal Recreational Lands Pass Program. Access Pass holders will also receive a 50 percent discount on these fees.
- 3) Regulate hunting times and areas to eliminate conflicts with sensitive wildlife and to ensure compatibility with refuge purposes
- 4) Use staff and volunteers to operate a check station
- 5) Close the refuge to visitors other than permitted hunters during the hunt days; the only exception is to continue to allow access to Bogle's Wharf
- 6) Establish a GS-9 Park Ranger/Law enforcement position (same position as identified under objective 1.5.1) to conduct outreach and enforce regulations that allow for a quality program

### Objective 3.3.3 (Youth Turkey Hunting):

Within 3 years of CCP approval, more than 80% of youth turkey hunters who are contacted claim to have had a quality turkey hunting experience on the refuge.

*Basis of the objective:*

Much of the basis for hunting turkey is similar to that described for white-tailed deer hunting under objective 3.3.2. Youth hunting is also recognized as a traditional, family oriented form of recreation. Instilling an appreciation for natural resources and promoting a conservation ethic in youth is a priority for the Refuge System. This youth hunt, implemented in partnership with the National Wild Turkey Federation, has been very popular and provides a great opportunity for outreach to participating youth. Our turkey hunt area map is depicted in chapter 3, map 3.8. As with deer hunting, we generally believe that the extent of our current program meets the needs of our public and provides a quality experience. However, we will continue to evaluate the program on an annual basis and modify it, as warranted, given new biological or visitor data.

### Strategies

*Continue to:*

- 1) Partner with the local chapter of the National Wild Turkey Federation, to implement guided youth turkey hunting on two days each spring. The National Wild Turkey Federation would continue to assist us in all components of the hunt.

**SUBGOAL 4:** Provide opportunities for environmental education and interpretation that enhance refuge visitor's understanding of the significant natural resources in the Chesapeake Bay area, as well as the important role the refuge plays in its conservation.

### Rationale for subgoal:

Environmental education and interpretation are two of the six priority public uses for National Wildlife Refuges. Opportunities are presently available for

both of these activities on the refuge. While we are not able to meet all requests for these programs, we believe we are offering quality programs to the best of our ability given current staffing levels, and without detracting from our visitor service's management emphases on wildlife observation and photography. Objectives under this subgoal would also help fulfill the Service's initiative to develop programs and activities that "Connect Children with Nature."

**Objective 3.4.1  
(Environmental Education):**

Over the next 15 years, facilitate opportunities on the refuge for partner-led and self-guided environmental education programs with developed curriculums, using established relationships with Kent County Schools, the National Aquarium in Baltimore, the Friends of Eastern Neck, and other partners as opportunities arise.

*Basis of the objective:*

Refuges are learning laboratories, and Service programs are designed to show students and teachers the value of fish and wildlife resources. The refuge offers a unique opportunity to explore in close proximity tidal and non-tidal wetlands, grassland, and forested habitats, as well as learn about managing those landscapes to benefit wildlife. Our staff encounters many demands for guided school programs and in-classroom programs that we are not able to meet. However, we believe we can facilitate other educators to use the refuge and offer excellent environmental education opportunities without expending significant refuge staff or funding resources.

The Kent County School District has curriculum requirements that include field trips to the refuge for every fourth-grade student. In recent years, no staff has been available to assist during these visits except to occasionally meet and provide a short introduction to the refuge. Development of environmental education lessons tailored to state curriculum would provide programs and activities for schools and other groups while increasing public understanding of wildlife needs, ecosystems, conservation, and habitat management for wildlife. Using our educational partners to assist in this endeavor has many benefits. These partners also act as supporters of the refuge and natural resource conservation, advocates for environmental education, and help us conduct outreach to the local community.

We will strive to meet the following guiding principles for a refuge environmental education program identified in Service policy (605 FW 6):

- 1) Teach awareness, understanding, and appreciation of our natural and cultural resources and conservation history;
- 2) Allow program participants to demonstrate learning through refuge-specific stewardship tasks and projects that they can carry over into their everyday lives;
- 3) Establish partnerships to support environmental education both on- and off-site;
- 4) Support local, State, and national educational standards through environmental education on refuges;
- 5) Assist refuge staff, volunteers, and other partners in obtaining the knowledge, skills, and abilities to support environmental education;
- 6) Provide appropriate materials, equipment, facilities, and study locations to support environmental education;

- 7) Give refuges a way to serve as role models in the community for environmental stewardship; and
- 8) Minimize conflicts with visitors participating in other compatible wildlife-dependent recreation activities.

This policy also identifies six guidelines on which to base environmental educational programs which we would also strive to adhere to. These guidelines range from connecting people's lives to the natural world, to strengthening conservation literacy and knowledge, to stressing the role of the Refuge System in conservation, and finally to instilling a sense of stewardship and understanding of our conservation history.

### Strategies

*Continue to:*

- 1) Allow the Kent County School District to use Ingleside Recreation Area for meeting their curriculum needs for fourth grade students
- 2) Partner with National Aquarium in Baltimore
- 3) Provide educators and students access to the conference room at the Visitor Contact Station for environmental education visits and lectures

*Begin within 2 years of CCP approval:*

- 4) Assist volunteers with the development and implementation of an environmental education program about global climate change and what conservation and stewardship actions could make a difference
- 5) Encourage the Friends of Eastern Neck and volunteers to expand partnerships with local schools and other educational institutions, as well as the Boy Scouts of America, to enhance utilization of refuge resources for self-guided environmental education through basic lesson plans developed with these partners
- 6) Revive involvement with Kent County School District to ensure most recent available materials are used for their fourth grade curriculum, which includes field trips to the refuge

*Begin within 5 years of CCP approval:*

- 7) Upgrade the visitor services specialist position to a GS-9 (same position as identified under objective 3.1.1) to reflect the increased complexity associated with developing and coordinating program plans and partnerships. This position will also allow us to accomplish all of the visitor services objectives and strategies.
- 8) Partner with NGOs and academic institutions and develop a network of educators willing to develop curriculum-based lessons using the refuge

### Objective 3.4.2 (Interpretation):

Within three years of CCP approval, more than 75% of refuge visitors who are contacted can explain at least three ways the refuge contributes to conserving natural and cultural resources in the Chesapeake Bay ecosystem, know the refuge is part of a national system of refuges, and indicate their plans to actively engage in resource conservation in the future.

### Basis of the objective:

Interpretation is one of the most important ways we can increase the visibility of the refuge while providing visitors with many opportunities to understand:

the variety of habitats on the refuge; the historic and cultural significance of the refuge; the importance of wildlife management; the variety of wildlife-dependent recreational opportunities available, and the mission of the National Wildlife Refuge System. Self-guided interpretation requires significantly less staff time than guided programs, and can effectively and efficiently reach many people.

Refuges provide visitors with an understanding and appreciation of fish and wildlife ecology and help people understand their role in the environment through interpretation programs and facilities. The refuge Visitor Contact Station and Bookstore, and hiking trails provide visitors with information about wildlife and refuge management through direct contact, brochures and interpretive panels. Although some new interpretive panels have replaced outdated panels, the general refuge brochure and other interpretive brochures, are outdated. Providing up-to-date interpretive materials to the visitor will enable us to raise awareness and understanding of the mission of the refuge. Interpretive materials also need to be developed that explain how the public's actions may contribute to shoreline erosion and wetland loss and what they can do to help. This would include refuge-specific materials about climate change and stewardship. It is also important that we provide a variety of interpretive programs and opportunities that appeal to a broad-spectrum of interests and learning styles.

Since moving the Visitor Contact Station/Headquarters to its current location, the former Headquarters building has served as volunteer/intern housing. This house is the site of the wind power and solar power station that has powerful interpretation and environmental education possibilities. The house itself serves as a reminder to all visitors of the historical importance of the refuge since it is the only house built as part of a large planned community of houses prior to the refuge being established.

We will strive to meet the following guiding principles for a refuge interpretive program identified in Service policy (605 FW 7):

- Promote visitor understanding of, and increase appreciation for, America's natural and cultural resources and conservation history by providing safe, informative, enjoyable, and accessible interpretive opportunities, products, and facilities;
- Develop a sense of stewardship leading to actions and attitudes that reflect interest and respect for wildlife resources, cultural resources and the environment;
- Provide quality interpretive experiences that help people understand and appreciate the individual refuge and its role in the Refuge System;
- Provide opportunities for quality recreational and interpretive experiences consistent with criteria describing quality found in 605 FW 1.6;
- Assist refuge staff, volunteers, and community support groups in attaining knowledge, skills, and abilities in support of interpretation, and,
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreational activities.

### **Strategies**

*Continue to:*

- 1) Maintain a universally-accessible full-service Visitor Contact Station with a bookstore run by the Friends of Eastern Neck. The Visitor Contact Station

will continue to include interpretive displays and various mounted species of animals found on the refuge. It will continue to include a rear deck with interpretive panels and a boardwalk trail leading to an observation blind. Interpretive panels will continue to be mounted along the boardwalk trail and inside the observation blind.

- 2) Provide interpretive facilities and materials at Boxes Point Trail, Wildlife Trail and kiosk, Bayview Butterfly Trail and observation platform, Duck Inn Trail, Tubby Cove kiosk, boardwalk and observation blind, Tundra Swan kiosk and boardwalk, Tidal Marsh boardwalk and observation blind, historic site at Wickes, Ingleside Recreation Area with interpretive kiosk and visitor contact station with interpretive exhibits. Once Visitor Service's plan is completed, make sure all interpretive infrastructure, information, and media are consistent with the plan
- 3) Plan interpretive exhibits that depict the rich cultural and historical resources on the refuge as a principle theme or subject, in addition to the refuge's natural resources
- 4) Allow permit-guided tours by outside groups, and continue to require permittee to provide information on each program offered on the refuge including type of program, number of participants, and number of programs offered

*Within 2 years of CCP approval:*

- 5) Develop and produce a new general refuge brochure
- 6) Develop and produce a refuge trails brochure

*Begin within 5 years of CCP approval:*

- 7) Upgrade the visitor services specialist position to a GS-9 (same position as identified under objective 3.1.1) to reflect the increased complexity associated with developing and coordinating program plans and partnerships. This position will also allow us to accomplish all of the visitor services objectives and strategies, and to:
  - a) Develop and produce a new refuge bird checklist and brochure
  - b) Develop and install an interpretive kiosk at Wildlife Trail parking area
  - c) Develop and install an interpretive kiosk at Bogle's Wharf
  - d) Develop and produce a butterfly brochure
  - e) Develop interpretive materials explaining the historic and cultural resources of the refuge to gain public awareness of their value and need for protection. This would include information about the proposed development on the island where the current volunteer house is located
  - f) Conduct comprehensive sign review on the refuge to ensure that all signage meets national and regional standards

**Objective 3.4.3  
(Demonstration Areas):**

Over the next 15 years, facilitate use of the refuge as a demonstration and learning site for such programs as BayScaping, best management farming and forestry practices, shoreline protection, and tidal marsh restoration.

**Basis of the objective:**

Our partners value the refuge as a place where certain programs and management activities are showcased and used as a tool for educating other land managers, researchers, local farmers or educators. The programs that draw the most interest are BayScaping, best management farming practices, and tidal marsh restoration.

BayScaping involves maintaining landscaped areas that use native plants which are both aesthetically pleasing, require little-to-no maintenance, and benefit wildlife, water and air quality. Our BayScape garden attracts a wide diversity of birds, butterflies and other insects during the growing season and is very popular with our visitors. The garden is maintained solely by volunteers, including some master gardeners.

Our sustainable cropland management program is a model in implementing best management farming practices which minimize impacts to soil and water quality and provides quality wildlife habitat. This is critical considering the refuge's close proximity to the Chesapeake Bay and its tributaries.

Our shoreline protection and tidal marsh restoration projects, including construction of breakwaters, treating invasive plants, and planting native marsh grass attracts a lot of interest from our volunteers and partners concerned about protecting the Chesapeake Bay shoreline. The restored tidal marsh and beach habitat has been a particular interest of researchers interested in seeing which plants and wildlife colonize the restored area.

We have also begun forest restoration in some upland areas and we expect this program will offer demonstration opportunities in the near future. Also, we will take opportunities to demonstrate our sustainable energy program, namely the solar panel arrays, once we make the final decision on whether to move them to the headquarters from the intern/volunteer house.

We are proud of these programs and enjoy the opportunity to share them with others. While we do not plan to institute a major tour program, nor develop any major infrastructure for this program, we would remain willing to accommodate use of refuge lands by others to the extent it does not interfere or conflict with other refuge priorities.

### **Strategies**

*Continue to:*

- 1) Encourage use of the refuge as a demonstration area for sustainable land conservation practices, in conjunction with other refuge outreach activities identified in objectives 3.1.1 and 3.1.2
- 2) Make sites accessible to partners, and develop education and interpretative materials to the extent funding allows or as provided by volunteer efforts

**SUBGOAL 5:** Provide opportunities for the public to engage in refuge activities through a Friends Group, an organized volunteer program, and through partnerships with individuals, other agencies, universities, and other institutions, thereby promoting the mission, management, and objectives of the refuge and the Refuge System.

### **Rationale for subgoal:**

Citizen involvement is critical to the well-being of the Refuge System and to the natural resources that depend on those lands. Working in partnership with other government agencies, and academic institutions, organizations, and individuals is vital to our operations. When local citizens and other stakeholders of a refuge can see firsthand our conservation work, they become an informed constituency on behalf of conservation.

Working in partnership with others also provides additional resources with which we can achieve our refuge goals and objectives. Our volunteers, Friends Group,

and other conservation partners provide valuable assistance in accomplishing refuge projects in all our program areas.

**Objective 3.5.1 (Friends Group Support):**

Over the next 15 years, enhance our relationship with the Friends of Eastern Neck to ensure we have a mutually beneficial working relationship; one that cooperatively promotes an appreciation of natural and cultural resource conservation and facilitates the implementation of priority refuge projects.

**Basis for the objective:**

The Friends of Eastern Neck have been valuable supporters of the refuge purposes and the Refuge System mission. Many important programs and projects get accomplished each year through their hard work, dedication, and fundraising. Since many members live in the local community, they are also very effective in helping us conduct outreach about the refuge and its opportunities, in addition to providing us feedback from the community.

**Strategies**

*Continue to:*

- 1) Maintain the existing agreement with the Friends of Eastern Neck; review and update on an annual basis as warranted
- 2) Work with the Friends of Eastern Neck to seek outside support for refuge projects, develop public use programs, coordinate refuge projects, operate the book store, plan and conduct public events, conduct community outreach, promote national Service initiatives as they develop, and respond to all public inquiries about the refuge
- 3) Appoint a primary liaison between the Friends of Eastern Neck and the Service
- 4) Support the Friends of Eastern Neck quarterly newsletter, which is distributed to their membership, by regularly providing information, articles, or photos about refuge management and visitor services programs
- 5) Work with the Friends of Eastern Neck on a regular basis to seek alternative funding sources and partnerships for various projects to benefit the refuge.

**Objective 3.5.2 (Volunteer Program):**

Over the next 15 years, encourage and facilitate an active, quality volunteer program that supports biological, maintenance and visitor services program priorities.

**Basis for the Objective:**

We are proud of our volunteer program and what we have been able to accomplish. Volunteers are integrated into all aspects of refuge management including maintenance, habitat management, and visitor services and outreach programs. Their hard work and enthusiasm enhances what programs we can offer. In fact, many of our visitor programs are run by volunteers, without whose assistance, we could not offer them.

**Strategies**

*Continue to:*

- 1) Actively recruit volunteers at events, through existing partners, the media and the refuge website
- 2) Develop and implement annual volunteer recruitment, training, and appreciation/recognition events

- 3) Utilize volunteers in annual community events such as the Chestertown Tea Party, Chestertown Wildlife Exposition and Rock Hall Fall Fest
- 4) Utilize volunteers in meaningful refuge work such as operating the deer check station performing various biological surveys, assisting with maintenance and visitor services activities

*Within 5 years of CCP Approval*

- 5) Upgrade the visitor services specialist position to a GS-9 (same position as identified under objective 3.1.1) to reflect the increased complexity associated with developing and coordinating program plans and partnerships. This position will also allow us to accomplish all of the visitor services objectives and strategies, and to increase the number of active volunteers by at least 25%.

**Objective 3.5.3  
(Maintenance of Facilities  
and Equipment to Support  
Research and Visitor  
Services Programs):**

Over the next 15 years, provide and maintain adequate housing, facilities, and equipment for interns, students, resident volunteers, researchers and other conservation partners.

**Basis of the objective:**

Providing housing, facilities and equipment for interns, students, volunteers, and other conservation partners provides us more flexibility in recruiting participants for these programs. Currently, two sites are available for housing.

**Strategies**

*Continue to:*

- 1) Maintain and make general repairs as needed to the house and a trailer used by over-night interns, volunteers, researchers, and other conservation partners participating in refuge projects and programs
- 2) Ensure that vehicles and other equipment are in good working order so that safety and efficiency are not compromised. Maintain and make general repairs as needed

*Within 5 years of CCP approval:*

- 3) Complete renovations to small volunteer suite currently located in the maintenance compound, making it suitable for lodging
- 4) Consider the feasibility of constructing an RV pad on the refuge to facilitate additional housing for volunteers

*Refuge headquarters*



Jonathan Priddy/USFWS